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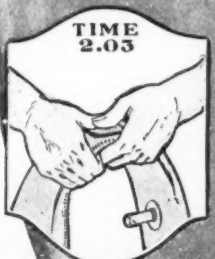
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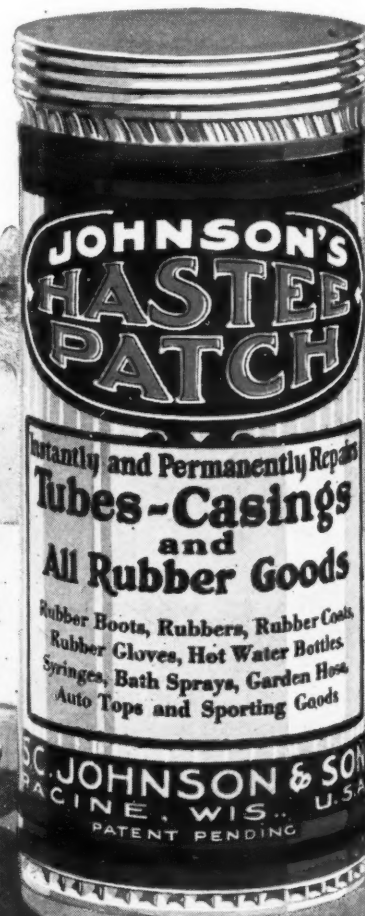
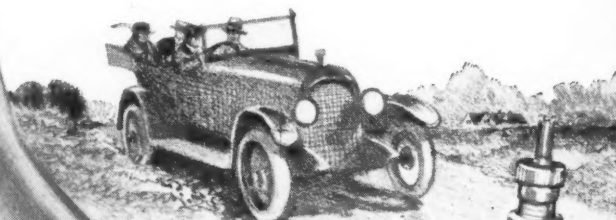
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AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XXXIX

NEW YORK—THURSDAY, AUGUST 15, 1918—CHICAGO

No. 7

Steel Decision Held Up By Delayed Inventories

Threatened 100 Per Cent War Program Apparently Due to
Failure of Manufacturers to File Steel Inventories Promptly

WAR BOARD REFUSES OFFER OF CAR MAKERS FOR 50 PER CENT REDUCTION FOR 1919

WASHINGTON, D. C., Aug. 14—The offer of the automobile makers to cut passenger car production 50 per cent for the year beginning August 1, 1918, as agreed upon at the meeting of the N. A. C. C. members in Detroit August 6 was not accepted favorably by the War Industries Board, which Board has answered the offer of the automobile makers by declaring that at this time it can not make any promises whatsoever regarding the supplying of steel, rubber and other materials to the automobile industry covering any definite period in advance.

The reason given for this reply is that at present it looks as if there will be little if any of the principal materials needed in the construction of a passenger automobile available for non-war industries after the war requirements have been taken care of.

The War Industries Board in its reply to the N. A. C. C. intimated that it was disappointed in not having received from the automobile makers the sworn inventories showing the quantities of different grades of steel on hand, and with which the War Industries Board hoped to arrange some plan for a balancing of inventories as far as possible.

At present perhaps 50 per cent of these inventories have been forwarded by the companies and there have been some delays with the others. Because of this the War Industries Board in its letter to the N. A. C. C. stated that no steel will be furnished automobile makers until they have filed with the board these sworn statements coupled with an agreement that the makers will

furnish to the Board any such additional information from time to time as it may require.

The War Industries Board holds out a moiety of hope against the 100 per cent reduction which it urged automobile manufacturers to make when it adds in its letter that as soon as it receives the sworn statements regarding inventories it will take appropriate action on them and immediately advise the makers.

The shortage of steel, rubber and other materials seems to be so acute in the estimation of the War Industries Board that it has urged the automobile manufacturers to undertake to get on a 100 per cent war basis by January 1, 1919, and adds that in no other way can the makers be sure of the continuance of the industry and the preservation of the organization.

The complete text of the reply of the War Industries Board to the offer of the N. A. C. C. is published herewith.

This letter from the War Industries Board was a complete surprise to the automobile makers, as well as to Hugh Chalmers, who had represented the N. A. C. C. before the Board. Only two days before this urging of automobile makers to get on a 100 per cent war basis not later than January 1, 1919, was announced in the letter, Mr. Chalmers waited on the Board and laid before it the offer of the automobile makers to make a 50 per cent cut in production for the year beginning August 1, 1918, as compared with 1917 production. In his hearing before the Board there was no intimation that the Board was contemplating any further action until it passed on

the various sworn statements on inventories of the companies. The present announcement given generally to the press has created a great amount of unrest and uncertainty throughout the industry, particularly as there is nothing definite as to what the board will do until it receives the inventories, when, according to its letter, it will take appropriate action and advise the industry.

It seems most unfortunate that such a conflicting atmosphere should have surrounded this entire matter, and doubly unfortunate that any such drastic announcement should have been made before the inventories which were asked for on July 16 should have been passed upon. It was expected that nothing of this nature would take place—in fact, such was the general understanding on the subject.

When Mr. Chalmers left his meeting with the War Indus-

tries Board he was certain some aid would be given the industry in securing steel. On the other hand, the War Industries Board, following Mr. Chalmers' departure, issued a statement informing the industry that it can only be assured of its continuance by conforming to the board's desire and going on a 100 per cent war work program.

The board does not explain how the passenger car manufacturers can continue business if they take on 100 per cent war work leaving .000 per cent organization and facilities for car manufacture. Neither does it tell the manufacturers how to secure 100 per cent war work. Presumably it leaves these puzzles to be solved by the industry.

Mr. Chalmers came to Washington Thursday to inform the War Industries Board of the unanimous vote of the N. A. C. C. to curtail passenger car production 50 per cent as com-

Full Text of War Industries Board Statement Regarding Steel Curtailment

THE sub-committee appointed Thursday, August 8, with full power to act for the War Industries Board concerning the output of automobiles, makes known its position in the following letter to the National Automobile Chamber of Commerce:

NATIONAL AUTOMOBILE CHAMBER OF COMMERCE,

7 East 42d Street,
New York City.

Gentlemen:

We are in receipt of and have given very careful consideration to your communication of August 8, embodying the resolutions passed at your meeting at Detroit, Tuesday, August 6. We note that the manufacturers have voluntarily agreed among themselves to curtail the production of passenger cars 50 per cent. While this is clearly a step in the right direction and furnishes a basis for each and all of the manufacturers, without further delay, to make appropriate reductions in selling, general and overhead expenses, still it is only a step, and further curtailment is inevitable. Fairness to your industry impels us to state frankly that the situation as it is presented to us to-day indicates very clearly that there will be little, if any, of the principal materials required in the construction of passenger cars available for non-war industries after the war requirements shall have been provided for, and the War Industries Board cannot at this time make any promise whatsoever regarding the supply to your industry of steel, rubber or other materials for any definite period in advance. We strongly believe that it is to the best interest of your members and all other manufacturers of passenger automobiles to undertake to get on 100 per cent war work as

rapidly as possible and not later than January 1, 1919, for in no other way can you be sure of the continuance of your industry and the preservation of your organization.

We regret that we are not in a position at this time to give you a more definite reply to your communication of the 8th instant due to the fact that the data and information which on July 16 we requested you to promptly furnish us have not yet been received. As soon as received prompt and appropriate action will be taken, of which you will be immediately advised.

No material will be furnished to any passenger automobile manufacturer until it has filed with this Board a sworn statement embodying the information requested on July 16 coupled with an agreement to furnish this Board with such additional information from time to time as it may require.

Yours very truly,
WAR INDUSTRIES BOARD.

At a meeting of the War Industries Board on Thursday, representative of the National Automobile Chamber of Commerce presented resolutions adopted at Detroit in which the manufacturers of automobiles voluntarily agreed to cut their production 50 per cent beginning with August of this year. Reference in the above letter to the request made on July 16 for certain information from the automobile manufacturers relates to the inventories of the steel which each manufacturer had on hand at that date.

pared with 1917. He also presented a pledge which the makers are willing to give. The N. A. C. C. meeting and vote were the result of a conference early in July between Mr. Chalmers and the War Industries Board, when Bernard M. Baruch, chairman of the board, suggested that the manufacturers should get together and determine what would be a safe maximum curtailment. In voting a 50 per cent cut the makers reached what they think is the largest curtailment compatible with industrial conditions and which they believe will allow retention of organizations and operation of business during the emergency.

Sub-Committee Appointed

Mr. Chalmers, after his arrival here, held four conferences with members of the War Industries Board. At the first on Thursday morning he presented the resolution of curtailment and the tentative pledge. At this meeting a sub-committee was appointed by Mr. Baruch which comprised Alexander Legge, Requirements Division; Judge Edwin B. Parker, Priorities Board; George N. Peek, Finished Products Section, and J. Leonard Replogle of the Steel Section, of the War Industries Board, to deal completely with Mr. Chalmers regarding the automobile industry.

Following the two conferences of the first day, Mr. Chalmers stated that nothing definite had been done beyond the presentation of the resolution and curtailment. His statement coincided with the rather noncommittal statement issued late that day by the War Industries Board, as follows:

"Hugh Chalmers, representative of the National Chamber of Commerce, appeared to-day before the War Industries Board and presented resolutions adopted unanimously by the automobile manufacturers at a special meeting in Detroit Tuesday. By these resolutions the manufacturers voluntarily agreed to curtail the production of passenger cars 50 per cent beginning Aug. 1. Mr. Chalmers also presented a tentative form of pledge which the automobile manufacturers are ready to make concerning their output. The War Industries Board has appointed a committee with full power to act for the board in the matter of automobile production."

On the second day here Mr. Chalmers stated that confer-

ences with the War Industries Board had been highly satisfactory. The board, he said, welcomed the co-operative spirit displayed by the manufacturers and was attempting to meet that spirit in turn. The 50 per cent curtailment figure was accepted by the board, said Mr. Chalmers, as a regulatory figure by which the manufacturers might guide themselves in making reductions in overhead, inventories and other similar expenses. However, he added, the board did not promise to provide steel to meet this figure. The situation, though, appeared optimistic. The meetings of Mr. Chalmers with the small sub-committee allowed for close, friendly and open discussion of the various problems connected with the curtailment. Such matters as the British complete curtailment of passenger car manufacture were brought up and discussed and explained. The difference between the Ford Motor Co., which has \$400,000,000 worth of war work and other smaller passenger car manufacturers unable to secure the war work was clearly defined.

Friendly Spirit Shown

When interviewed after his meeting with the board Mr. Chalmers said that no decision had been arrived at and that none would be until after all of the inventories of steel now being compiled by the manufacturers were received in Washington and checked by the War Industries Board, following which definite decisions regarding the allotment of steel to the industry would be made. Mr. Chalmers emphasized the exceedingly friendly spirit by which he had been met by the board, and was certain that all that could be done would be handled in a broad spirit by the board at the next conference, which is to take place in about 10 days. Asked if the board would issue any further statement, Mr. Chalmers said that this was answered in the negative, saying that there was nothing further that the War Industries Board could say at this time.

After Mr. Chalmers left Washington the War Industries Board addressed a letter to the New York office of the N. A. C. C. urging that the industry get on a 100 per cent war work basis. This letter, together with comment, was issued to the general press.

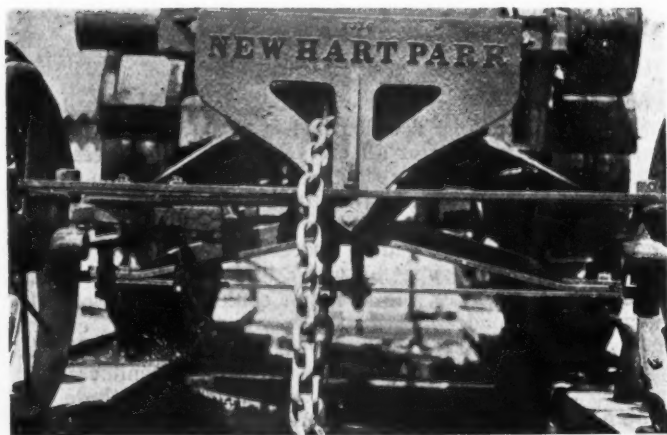
Fighting Motor Trucks on the Italian Front



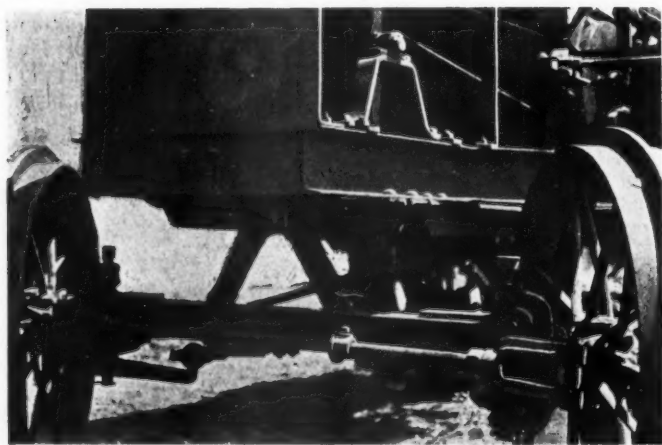
An Italian anti-aircraft battery operating on the Corso. The Italians, from the very beginning of their participation in the war, have been extensive users of motor-propelled apparatus, and because of the mountainous character of the country through which their battle lines run they have benefited greatly thereby

Possibilities for Standardization in Tractor Front Axles

Each Manufacturer Now Compelled to Design and Make His Own, With Resulting Variety of Type and Increased Cost of Production—A Few Standard Designs Would Meet All Requirements



Arch type of built-up axle



Bolster bracket carried on axle



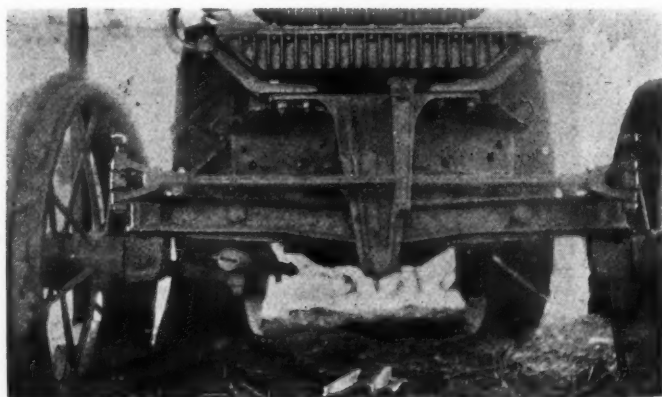
High bracket between axle and frame to give height for the rear end

WHAT should be one of the easiest tractor problems to solve is the design of the front axle, and of all the components of a tractor there is hardly one which lends itself more to standardized or specialized manufacture. However, there are no signs as yet that tractor makers are getting their front axle designs from axle manufacturers, for hardly any two tractor front axles are similar in shape, and much less in dimensions.

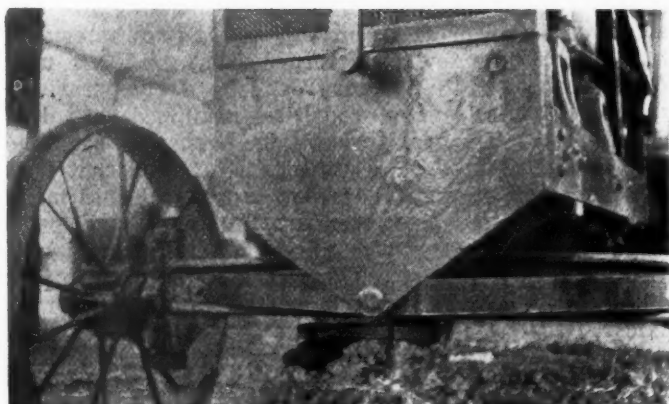
The divided or Ackerman steering axle is now used on the great majority of tractors, though a few makers still stick to fifth wheel steering, the axle being turned by means of heavy chains wound around a drum which the operator turns through a worm and wheel mechanism. This latter is the accepted steering gear for heavy steam tractors, and those makers of gas tractors whose previous experience has been with steam tractors somewhat materially cling to this practice.

Of the Ackerman type axles practically all carry the load at the middle through a pivot support. To take up the horizontal shock on the axle when one road wheel strikes an obstruction, diagonal radius rods are run from points on the axle close to the steering heads to points on the frame at or close to the fore and aft axes. In a few instances the need for these radius rods is obviated by providing two bearings for the central pivot support a considerable distance apart or by providing a vertical disk at the forward end of the frame against which the axle rests.

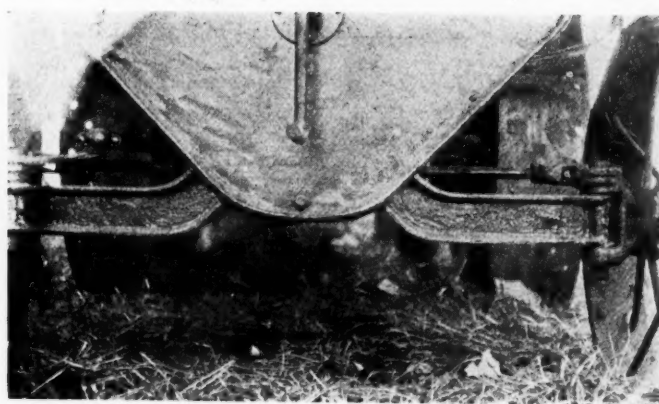
In practically all tractors the frame is considerably higher than the front axle, because it lies on top of the rear axle, which is higher than the front axle, as the rear wheels are of greater diameter than the front. To make front axle and frame join up, some makers kink the axle up at the middle, others provide the frame with a downwardly extending bracket, while still others secure a sort of pedestal to the axle to which the frame is pivoted.



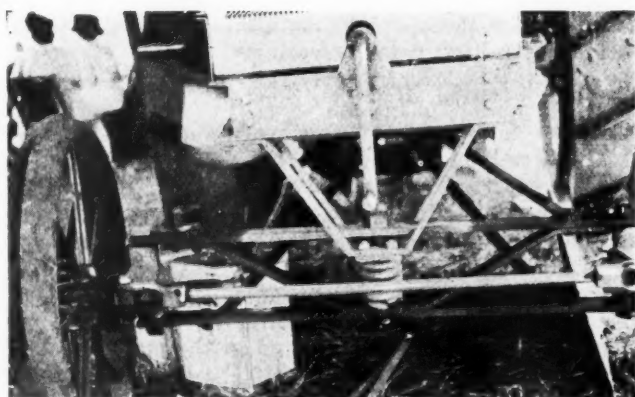
High pivot together with Lemoine pivots to give front end height



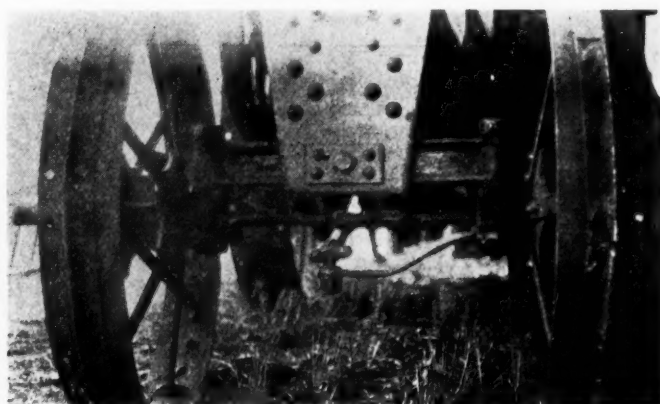
Axle with inverted Elliott steering knuckles



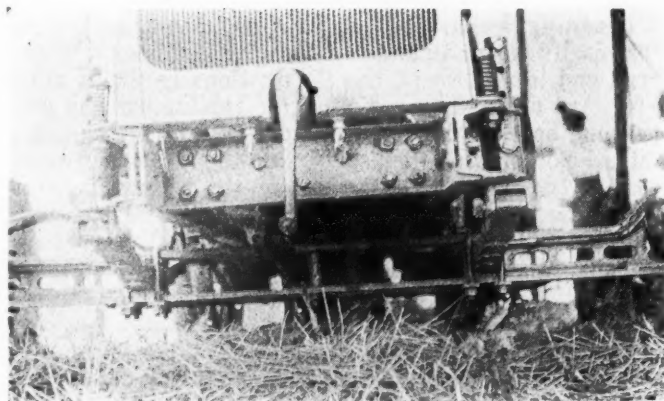
Axle with center kick-up



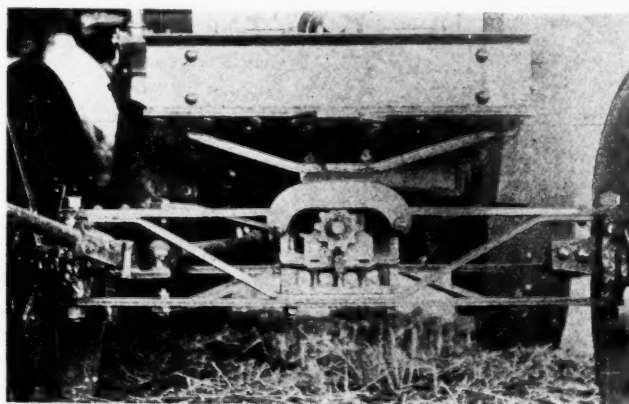
Built-up axle with spring support



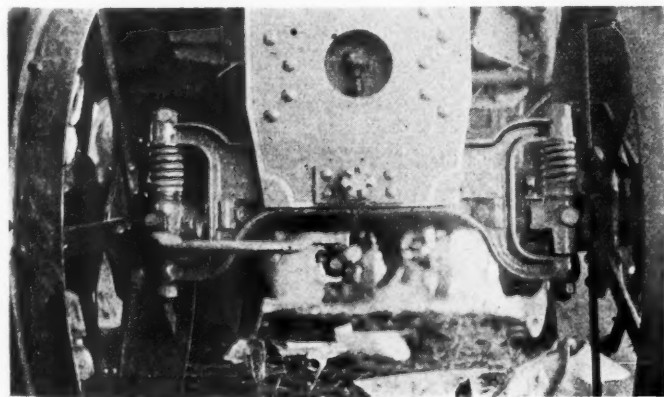
Short axle and high center bracket raising frame above front wheels



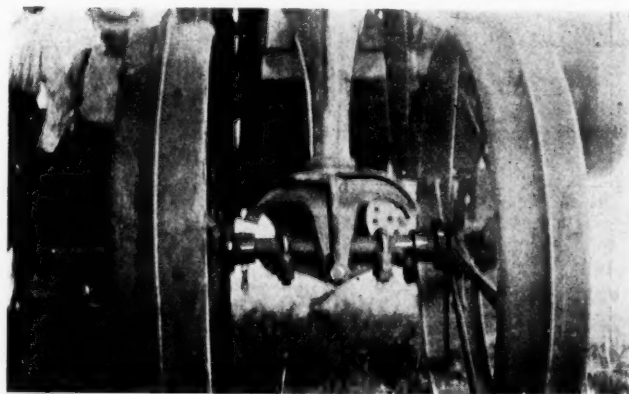
Built-up axle with 1/2 ell



Axle with transverse adjustment for furrows



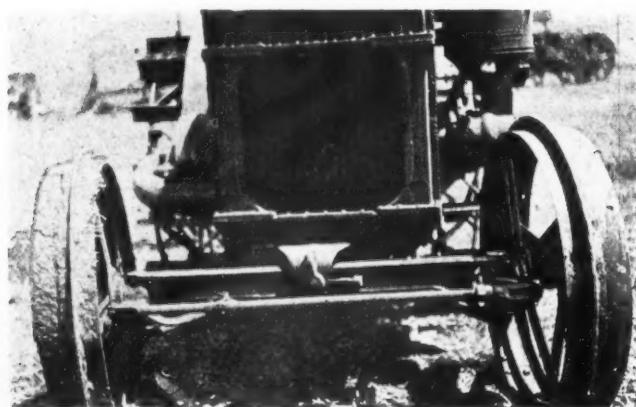
Spring support on steering knuckle



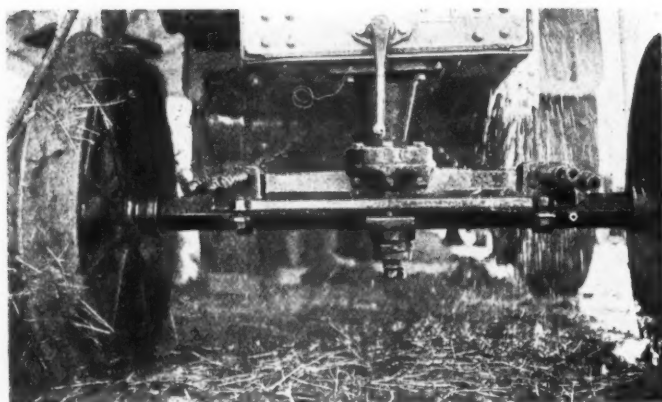
Extremely narrow tread front end



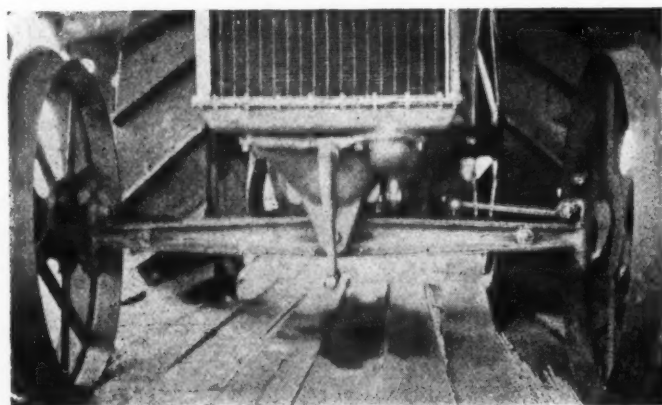
Arched axle with diagonal radius rods



Straight axle with inverted heads



Fifth wheel steering design



Axle section varies in proportion to bending moment

From the standpoint of ease in manufacture the straight axle seems to be preferable. It is quite evident that as yet only few drop forged front axles are used on tractors, or, to be more explicit, a comparatively small number of tractor models are equipped with drop forged axles. The drop forged axle is generally regarded as the highest type of axle construction, and that it is not used more extensively is due to the fact that many makes of tractors are not turned out on a sufficiently large scale to warrant the comparatively heavy investment in dies necessary. Those tractors which are produced in the largest numbers generally have drop-forged axles. Others employ cast steel axles and built-up axles of strip steel or partly of strip steel and partly of castings. The built-up axle is certainly not the tractor axle of the future. Its use may be fully warranted, however, at the present time because its manufacture may be within the capacity of the truck manufacturers' own works, and independence of outside shops is quite an advantage in these strenuous times, even though the tractor has a high priority rating.

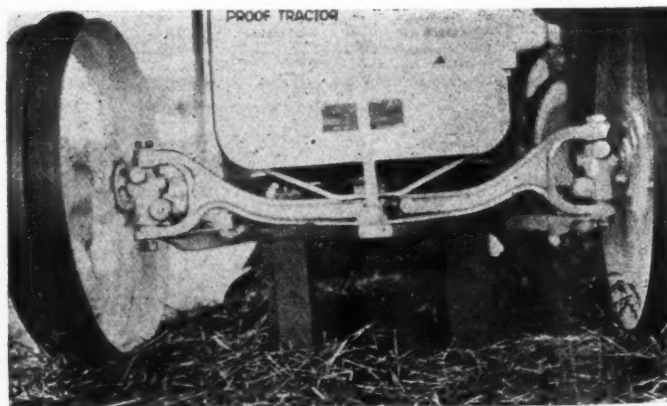
Variety in Steering Heads

As regards type of steering heads and knuckles, all of the three well known designs are in evidence—the Elliott, the inverted Elliott and the Lemoine. The Elliott appears, however, to be in the lead, and it would not be surprising if it won out in tractor work the same as it has in automobile work.

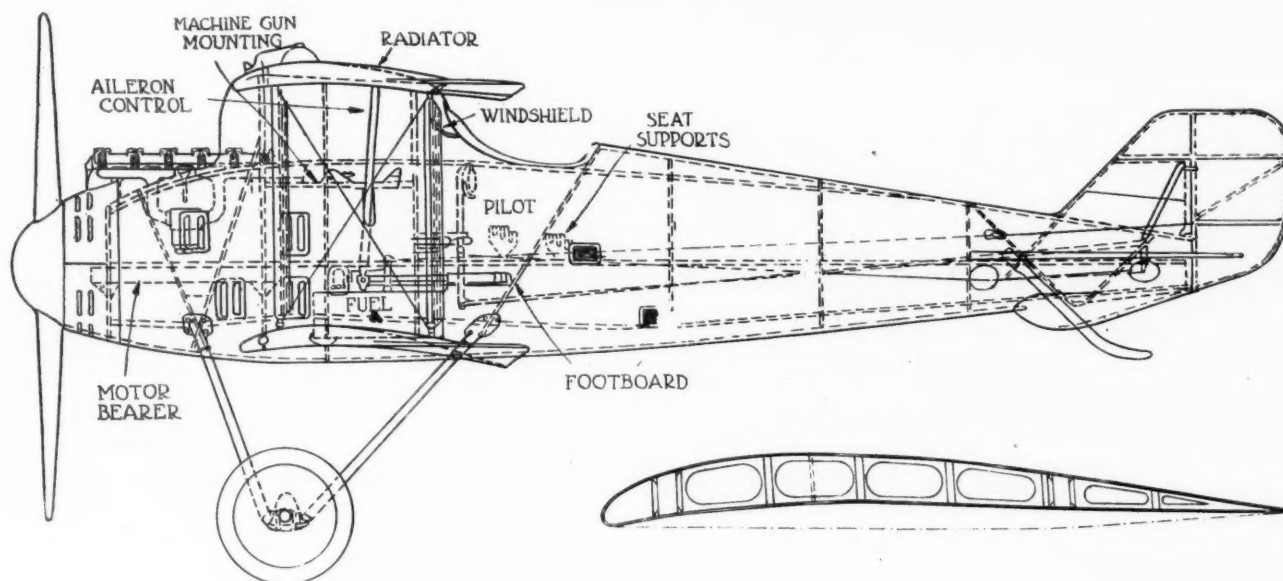
In examining tractor front axle designs one misses that nice distribution of material in accordance with variation of load as may be found in the more developed automobile axle. For instance, if the load is supported at the middle of the axle the vertical bending moment will be greatest at that point and the height of the section can decrease toward the steering heads.

Although the advantage of spring-mounting a tractor is generally recognized, and spring mounting can be most easily effected and is of the greatest benefit at the front end, only two of the illustrations herewith show a forward spring suspension. One tractor has the conventional half elliptic springs under each frame side rail, while the other has coiled springs on the steering knuckle pins, through which the weight of the tractor forward part is transferred to the stub axles. This latter construction looks very simple and attractive, though some difficulty might be anticipated with the lubrication of the pins.

EXPERIMENTS recently carried out are said to have shown that the inner tube of pneumatic tires keeps its elasticity for a long time when lying in a solution of 10 per cent glycerine and 1 per cent soda in water.



Axle with drop effect and rather prominent steering yokes



The Roland Single Seater Fighter

Mechanical Details of a Fast Machine of Very Light Construction—Fuselage Built of Plywood Covered with Fabric

A SOMEWHAT detailed description of the Roland single seater biplane, one of the fast German machines, appeared in a recent issue of *L'Aerophile*. We have redrawn the illustrations accompanying the article and reproduce the following from the description.

The single seater Roland biplane D-II, which first made its appearance at the front in March, 1917, is again frequently met with by French pilots, especially in the eastern sectors. The principal dimensions of this machine are as follows: Span of upper plane, 29.2 ft.; span of lower plane, 27.9 ft.; length, 22.8 ft.; height, 9.7 ft. The weight of the machine, 1820 lb., is slightly greater than that of the Albatross D-III. As it has a lifting surface of 248 sq. ft., the load carried per square foot is about 7.3 lb.

The construction of the fuselage is noteworthy. It is built entirely of plywood, covered with fabric, monocoque fashion, and it has an oval section which ends in a vertical knife-edge at the stern post. The construction is very light, the framework consisting of very thin longerons extending the whole length of the fuselage. Rigidity is secured by means of plywood partitions uniting the middle of the top half with the middle of the bottom half. The total thickness of the six layers of the plywood is only 1/16 in. At the rear of the pilot's seat there are only four thin layers. Between the pilot's seat and the engine there is a superstructure to the fuselage which thins out at the top to a fin 4.4 in. thick, to which are attached the radiator and the upper plane.

The central section of the upper plane is hollowed out to provide space for the radiator. In this way the cabane is eliminated. On the lower part of the fuselage there are two shoulders, one on either side, to which the lower planes are secured. At the rear the tail skid, built of timber and shod with metal, penetrates the fuselage through a kind of swelling, which reminds one of the Nieuport construction. The pilot is seated high up, his vision being assured by two windshields placed one on each side of the central ridge. The field of vision is

very obstructed and visibility is not so good as in other machines.

The planes are trapezoidal in plan, unequal in span, without stagger or dihedral, but swept back $1\frac{1}{2}$ deg. Their chord is uniformly 57 in., and their gap 53 in. Their ribs are perpendicular to the leading edge, and, as each strut of a pair is attached to a common rib and the wings are swept back, the struts are not exactly one behind the other.

The upper planes are formed on two spruce spars placed 32.6 in. apart, the front one being 5.12 in. from the leading edge. There are 12 ribs, which are placed 14.6 in. apart and are interspaced with laths 0.4 in. wide, running from the leading edge to the rear spar. The distance between the main spars is maintained by four compression members consisting of steel tubes. These are 1 in. in diameter and are placed at equal intervals of 5.4 in.; they are cross-braced by $\frac{1}{8}$ -in. piano wire. Two fabric strips between the leading edge and the front spar and two others between the front and rear spars alternately pass from one rib to another, over and under it. Some angles in the wing frame are kept rigid by plywood angle pieces.

The ailerons, which are fitted to the upper plane, do not project and are unbalanced. A strip of plywood placed over the fabric protects the aileron hinge at its attachment to the rear spar. Along this line the aileron measures 71.6 in. It is 16.5 in. wide. Its pivot consists of a 1.2-in. tube. The aileron cranks are operated by two vertical tubes, Nieuport fashion.

In the upper left-hand wing there is a gravity feed fuel tank. The upper planes are attached directly to the highest part of the fuselage, with the aid of a special bolt which recalls the system of attachment used on the R.V.G. CIV.

The structure of the lower wings is like that of the upper wings. The spars are disposed in the same way and, consequently, maintain the same distance between one another. There are ten ribs to each wing, of which

nine are 0.4 in. and the last is 1 in. thick. Between any two of them there is also a light lath 0.4 in. thick. The bracing is the same as in the upper wings, except that the struts, made of four steel tubes, are slightly different, the first being of 0.8 in. and the three others of 1 in. diameter. From the first to the second is 46 in., from the second to the third, 44.5 in., and from the third to the fourth, 43.7 in.

The lower wings are secured to the stub planes on each side of the base of the fuselage. The angle of incidence is 4 deg. at the second rib and 3 deg. at the seventh. The inter-plane struts are of 1 in. diameter, placed inside a stream line of wood which gives them a depth of 3.6 in.

The whole tail unit is of a trapezium form, with a large triangular piece of small depth cut out of the base. The fixed tail plane is of wood and the two balanced members forming the elevator are entirely of metallic construction. The leading edge of the fixed tail plane is of wood, hollowed on the inside. A piece of wood, which traverses the fuselage and sticks out 20 in. on each side of it, is embedded in the hollow part of this leading edge and thus insures absolute rigidity. Two struts of streamline tubes running from the top of the fin to the angle of the elevator further add to the rigidity. The rudder is almost rectangular in form, with rounded corners. It is balanced by a triangular part surrounding the pin, of which the leading edge is similarly oblique. The rudder

is tubing and the pin is of 3-ply wood forming part of the fuselage.

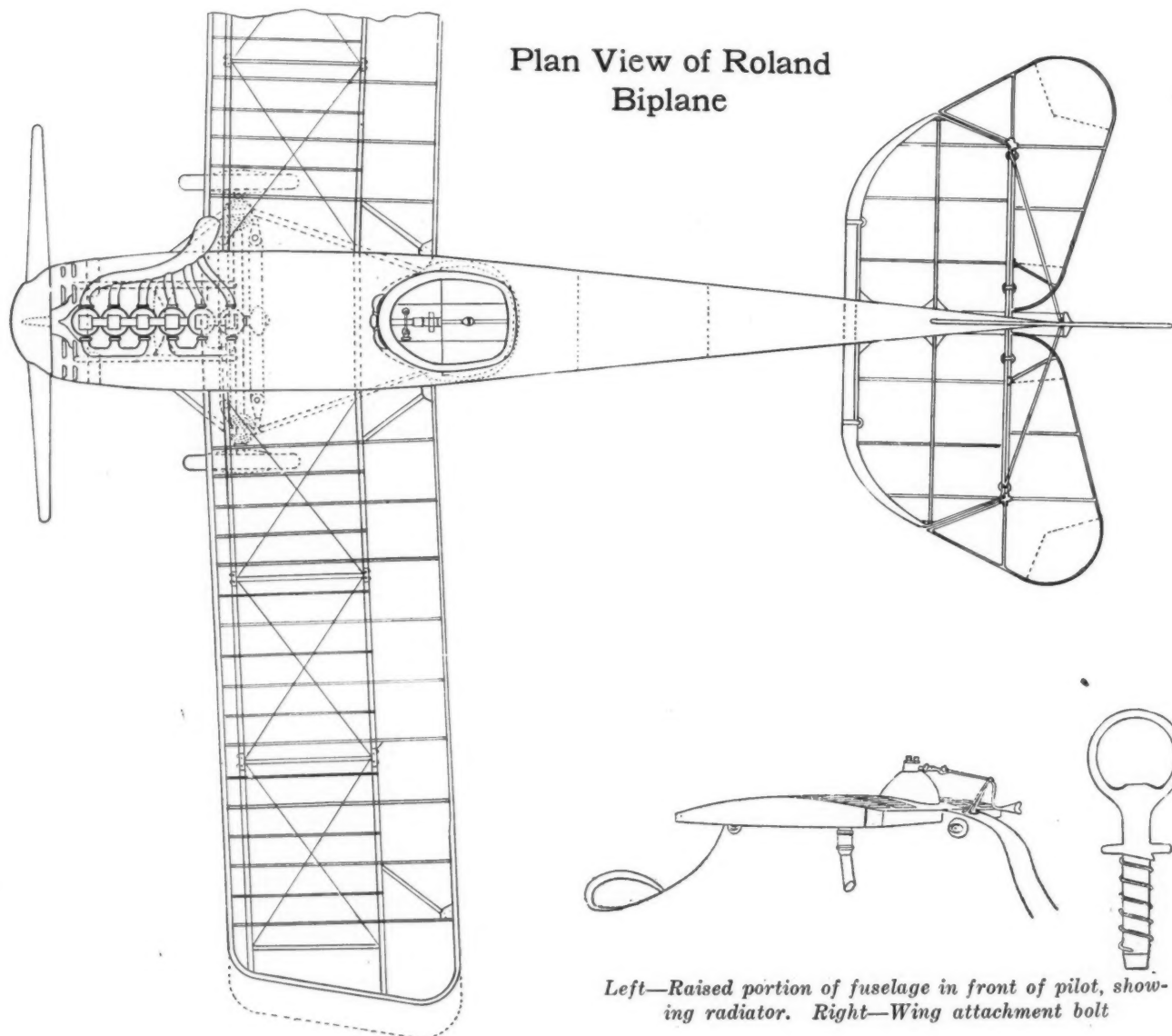
The control cables of the elevator are concealed inside the fuselage and those of the rudder only come out of the fuselage about 40 in. from the end.

The single-seater Roland D-II is fitted with a Mercedes engine of 160 hp. of a type already described. Besides the supplementary tank placed in the upper left plane it has a tank measuring 28 x 28 x 10 in. under the rudder bar.

There are two Spandau machine guns operated by the motor. They are placed one on each side of the engine inside the fuselage, from which they only protrude at the front.

The undercarriage is formed by two tubular V's held together by two cross cables. Their point of attachment corresponds to the base of a partition of the fuselage. The axle is placed between two tubes and is inclosed in a streamline casing. The wheel track is 70 in. The wheels are 30 x 3.94 in. and the springing is of rubber cords.

It has been said that the D-II Roland, owing to its light construction, often suffers from a deformation of its fuselage and is very apt to spin. It is, however, certain that this machine, which was quite a new idea at the time of its creation, has been among the best of the German chaser machines.



Left—Raised portion of fuselage in front of pilot, showing radiator. Right—Wing attachment bolt

Steering Creeper and Two-Wheeled Tractors

An Outline of Various Plans for Steering Tractors by Other Methods Than That Involved in the Ackerman Steering Axle

By A. C. Woodbury

IN tractors of the most familiar type there are two rear driving wheels and two front steering wheels, just as in a motor car. It is necessary that the steering wheels carry a portion of the weight of the tractor, as else they cannot serve to guide the machine, especially where rough ground, unequal traction or other unfavorable conditions make it difficult to follow the desired course. This weight on the steering wheels must be a net weight, after deducting from the dead weight the lifting tendency due to the torque reaction at the driving wheels and correcting for the effect of any change of the center of gravity due to grade. Three-wheeled tractors and even some creeper or track-laying tractors also have

ing axle, engine and all, pivoted to a backwardly extending member which is attached to the plow or other implement which is being drawn. The driver sits on the implement seat and the tractor controls are brought back to a position where he can conveniently reach them. Thus the combination of the tractor with a two-wheeled implement forms a four-wheeled unit, of which the front two are both the driving and the steering wheels. Steering is accomplished by a pinion and a large sector, the former connected to the steering hand-wheel, the operation of which pivots the whole front unit almost as the front wheels of a wagon pivot on the "fifth wheel." As the front unit is so heavy, an independent brake is provided on each side to assist in making a turn. The drive is through a differential of a type which is not free and therefore tends to make the tractor follow a straight course.

Electrical Steering

Since electrical equipment is beginning to make its way among tractor builders, it would not be a long step to introduce electrical control for this type of steering. An irreversible worm and sector might be substituted for the pinion and sector, the worm to be driven by a small electric motor attached to the backwardly extending tongue of the tractor. A controller for such a device is illustrated in diagram in Fig. 1. The sector, made of insulating material, is mounted on the tractor, A being concentric with the pivot of the tongue. The four strips shown are connected to the battery terminals, as indicated by the + and - signs. The two full circles represent brushes which are connected to the terminals of the steering motor and mounted on a swinging arm attached to the tongue at A and connected to the steering hand-wheel or lever. When the tongue is at right angles to the axle, as in straight ahead driving, and the arm is in middle position, the brushes will be in the positions shown by the full circles. If it is desired to turn to the left the arm is moved so the brushes make contact with the right strips as shown by the dotted circles. This starts the steering motor in the direction required to turn the tractor toward the left, and as the tractor turns the sector is carried with it till the relative positions of sector and brushes are as shown by the full circles. When this position is reached the motor is disconnected from the battery and stops. When it is desired to straighten out again it is only necessary to return the arm with its brushes to its middle position and the tractor will follow.

A popular way of steering creeper tractors is by merely applying a brake to the side toward which the tractor is to turn, the tracks being driven through a differential. A creeper tractor generally tends to run in a straight line unless the resistance is considerably greater on one side than on the other, but a differential lock is sometimes added to make the control more posi-

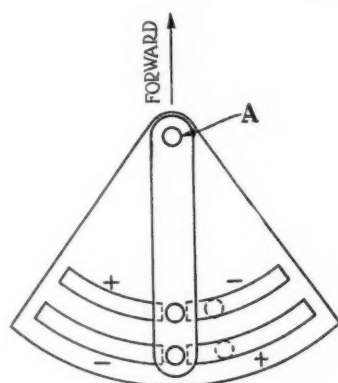


Fig. 1—Controller for electric steering gear

a steering wheel which must similarly bear a portion of the weight of the tractor in order to be effective.

When compared with a four-wheel drive tractor or a creeper tractor whose whole weight is carried on its tracks, any weight carried on the steering wheels is wasted so far as producing traction is concerned. In other words, this loss is a part of the price paid for avoiding the complications of the types in which all of the weight is carried on the drivers. Without discussing the comparative merits of the various types, we may say that large numbers of the creeper type tractors are sure to be built, and if problems connected with the two-wheeled type, such as those of steering, attachment to implements, and transportation when not attached to any implement, are worked out to the complete satisfaction of the users, this type may prove to be the most practical of all for many farmers.

The problem of steering a tractor by its driving wheels has been solved in various ways, all more or less practical but none altogether ideal, and it seems to offer a profitable field for improvement. Following is a description of some of the possible solutions, some of which are in commercial use, while others are only possibilities.

The method used for steering one of the most popular two-wheeled tractors is to have the tractor unit, includ-

tive. This is probably the simplest steering control that can be found for the creeper type tractors, and on that account it may be the ultimate, but it certainly is not ideal for delicacy. The brakes are controlled by turning the steering hand-wheel to one side or the other enough to obtain the required amount of friction, and the amount required for a certain turn depends upon the nature of the ground and other conditions. A driver who is experienced with this sort of steering can control the tractor well, but to a novice at least it seems to leave something to be desired when compared with the direct and positive steering of a motor car. Of course, there is also some loss of power resulting from the application of the brake, but this is quite negligible under ordinary conditions.

It seems to the writer that a real improvement can be made on this type of steering by developing other means than brakes for controlling the differential. One device

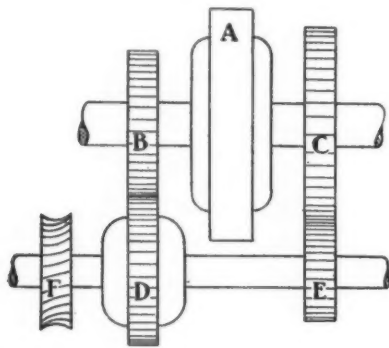


Fig. 2—Steering through the differential

for this purpose has been described in the trade press and is perhaps covered by patents but has not been commercially applied to creeper type tractors. It is diagrammatically shown in Fig. 2.

The differential and drive gear through which power is transmitted to the axle, bull pinion shaft or sprocket shaft (for brevity we will call this the axle) are represented by A. Beside the differential are two gears, B and C, one of which is attached to the axle shaft and the other either to the differential case or the other axle shaft. These two gears mesh with gears D and E on a parallel shaft. Gear D is mounted on a second differential, while gear E is attached to one of the shafts projecting from the second differential. The gear ratios are such that when gears B and C are rotating at the same speed, as they do when the tractor is following a straight course, gear E turns twice as fast as gear D. Under these conditions the other shaft projecting from the second differential, with the worm gear F mounted upon it, remains stationary. This is due to the properties of a differential which cause one wheel of a car to rotate at twice the speed of the drive gear when the other rear wheel is held stationary. This worm gear F therefore gives us absolute control of the action of the main differential and through it of the direction of the tractor. So long as it is held stationary the two drive wheels or tracks can turn only at the same speed and the tractor can go only in a straight line either ahead or backward, while turning the worm wheel in either direction causes one wheel or track to advance ahead of the other, thus changing the direction of the tractor. The worm wheel may be turned by a worm either connected directly to a steering hand-wheel or to a shaft that can be power driven in either direction at will.

Another method of controlling the differential would require a shaft parallel to the axle as in the last described device. This shaft would be solid and would be connected

to the axle at one side of the differential by a chain and at the other side by a belt with variable pulleys, or by some other variable speed drive. The sprocket ratio should be the mean of the variable drive ratios, and the greater the variation possible in the drive the greater would be the available turning angle. The turning angle could be increased by connecting one of the drives to the differential case instead of to the axle shaft, or by replacing the chain connection with a duplicate variable speed drive, the controls of the two being interconnected.

A simpler arrangement is available if the drive is such as to make it possible. This would consist merely of a variable drive to one side of the differential from the same shaft from which the main drive is taken. It might be a belt on variable pulleys beside a chain drive, a friction disk and chain beside a worm or bevel gear drive, or some form of hydraulic drive. Of course, no drive for controlling the differential as suggested would need anything like the capacity that would be required if the whole or even half of the power of the engine were to be transmitted through it. Therefore variable speed devices that would be out of the question for driving the tractor might be quite practical for controlling its direction.

One of the simplest ways of controlling the direction of a creeper type tractor is to omit the differential and provide instead a clutch between each track and some common point in the drive. Releasing one clutch transfers all the driving effort to one of the tracks, which then naturally runs ahead of the other and causes a turn. The nature of the ground and the amount of draw-bar pull being exerted effect the sharpness of the turn and we believe brakes are provided as a further means of regulation.

Application of Hydraulic Drive

An ideal drive which would include steering and gear changing as well could certainly be obtained by hydraulic means if hydraulic drives were all their most enthusiastic friends would have us believe. Two variable displacement pumps and two hydraulic motors would be required, together with a method of control which would make it convenient to vary the displacements of the two pumps either simultaneously or independently. The last would not be difficult, but the whole thing has a rather expensive sound and there is some question whether durability and freedom from leakage could be secured in the gritty, dusty conditions in which agricultural tractors work.

A variation of this drive would be to provide a change gear and a gear drive to one track or wheel and a variable hydraulic drive between the change gear and the other track or wheel. This would probably reduce the cost at a sacrifice of some of the ideal qualities of the purely hydraulic drive.

Of course, other variable speed drives are also available, including friction and variable belt drives. Friction drives have already been used to some extent for propulsion of small tractors at least. It remains for those who are commercially interested in these various drives to show how they can be advantageously applied to this steering problem.

To the writer it seems that some one of the methods outlined for controlling the differential other than by brakes, or some simpler means of accomplishing the same result as effectively, would prove a very desirable method of steering either a creeper type of tractor or one carrying practically all its weight on two drive wheels. It should be easier to control than the steering now generally provided, and might prove a convenience in getting the latter type from one implement to another.

Official Guide for Airplane Inventors

Possibilities for Inventions and Improvement in Aircraft Design as Stated by
Naval Consulting Board and War Committee of Technical
Societies—New Ideas Solicited

SUGGESTIONS for the improvement of existing aeronautical devices and new aeronautical inventions are solicited by the Army and Navy in a bulletin issued with the approval of Josephus Daniels, Secretary of the Navy. The bulletin compiled by the Naval Consulting Board and the War Committee of Technical Societies tells in detail the possibilities of airplane motor power improvement, problems in aeronautics, aircraft problems and contains a working bibliography for airplane design and aero motors.

Many great improvements, it is pointed out, have been made by men with little practical experience or technical training, and every citizen with a "free brain, clear insight and fresh enthusiasm" is invited to submit inventions and ideas to Thomas Robins, Secretary, Naval Consulting Board, 15 Park Row, New York City.

At present, adds the introduction, the Government is concentrating all energy on speedy production of the best design secured from present engine development. Consequently the Government is not just now in a position to consider improved engines and systems of power and will defer this until after the pressing needs of the moment have been met. Minor improvements applicable to the present engine will be considered at any time, however.

Possibilities for radical advances in motive power are shown by the following outline. Cost of power, it is stated, is immaterial for war uses. The important objects are:

To secure steady, reliable operation.

To obtain lighter weights than the 2 to 2.5 lb. per horsepower now attained. (1.75 lb. without radiator, water, piping, propeller, etc.)

To obtain more work per pound of fuel carried.

The average airplane engine operates under the following approximate conditions, showing the possible improvements for all new power cycles and gas turbines:

Energy of fuel delivered by engine shaft to propeller (thermal efficiency). For the indicated horsepower	30 per cent
For the brake horsepower	25 per cent
Energy consumed by engine friction	5 per cent
Energy lost by cooling	30 per cent
Energy escaping in exhaust (including that of unburned fuel	40 per cent

Total fuel contents	100 per cent
Mechanical efficiency of propeller	75 per cent
Net energy of fuel delivered by propeller and available for flight (0.75×0.25)	19 per cent

Conservative airplane engine improvements discussed by E. H. Sherbondy, U. S. Airplane Engineering Department of the Bureau of Aircraft Production, deal with carburetion, precompression of air supply for engine, ignition, engine parts, self-starters, exhaust mufflers, cooling radiators, fuel system, fuel, propellers, machine gun synchronizers and instruments. Suggestion is made by Mr. Sherbondy that those interested in these problems should read back issues of the American, English and French periodicals devoted to aeronautics and automobile engineering, and the works listed in the bibliography attached.

The chief problems refer to improvements in motor power apparatus, its specific weight, and its thermal efficiency referred to brake horsepower and the reliability of its mechanical construction. Many helpful suggestions, it is stated, may be obtained from studies of experiments which have failed for reasons that may not now be operative because of the existence of better materials and increased experience. This point is illustrated in the history of automobile rear axle drives.

For many years straight bevel gears were used. The helical bevel gear, known many years, did not come into practical use until 1912 because economical production had not been devised.

The present state of aircraft engine design is summarized as follows:

Engine types are practically standardized and include two principal types, one having 6 or 8 vertical cylinders all in line, the other being the "V" type with 8 or 12 cylinders. Aluminum has greatly increased the possibilities of radial types of engines in moderate powers, these being designed with either fixed or rotating cylinders and either air or water cooling. To be useful for aircraft work an engine must not weigh more than 2.4 lb. per brake horsepower (1.7 lb. without radiator, water, piping, propeller, etc.). It must be composed of parts that can be readily produced by American manufacturers. The thermal efficiency of current types of aircraft engines referred to brake horsepower ranges from 25

The Government Asks for Ideas for the Improvement of:

Engines	Fuel Systems	Materials
Planes	Propellers	Production
Carbureters	Instruments	Self-Starters
Ignition	Compasses	Spark Plugs

per cent to 32 per cent, this being the proportion of the original heat content of the fuel consumed which appears in shaft horsepower. While the efficiency of these engines is higher than any other type of prime mover, including commercial Diesel engines within the output range of aircraft engines, their economy is rather low at less than maximum horsepower, and every effort should be made to improve economy at part load. The economy varies but little for considerable changes in altitude, so that in this matter the effective altitude is not often of importance.

Improvements suggested for the present system of motive power should be of a nature allowing development to a practical stage within about 6 months; that is, the apparatus should be experimentally proved and ready for production at the end of this period.

Improvement of carburetor regulation for varying altitudes is sought. In a given engine operating successfully at two different altitudes under identical conditions, i.e., at the same speed and with the same carburetor adjustment (the same sectional areas for the passage of air, gasoline and mixture) the amounts of air (by weight) drawn into the engine in the same time are proportional to the barometric pressures at the two altitudes. The volume of air drawn in remains the same. The density of the gasoline does not vary with the altitude and the effect of changes in altitude upon the mixture quality is a resulting increased richness of carburetor mixture in higher altitudes, which varies inversely as the square root of the ratio of barometric pressures (assuming the engine speed and throttle position to remain constant). While this is approximately correct for ordinary elevations it is decidedly true at altitudes over 15,000 ft.

This causes the need for carburetor regulation for varying altitudes. This regulation is now effected by a device called an altimeter, which controls the gasoline flow through the carburetor nozzles. This may be accomplished either by re-

(Continued on page 286)



The S. V. A., which is equipped with a Spa engine of 240 hp. This is a one-seater airplane used for low fire, pursuit and fast reconnaissance. Note the tubular, inclined braces

Plans and Accomplishments of the Italian Air Service

Italy Is To-Day Supplying All Its Own Needs in Motors and Planes—
Must Have American Raw Materials—Types of
Machines That Have Been Developed

IF the Allies can increase their air forces by 10,000 more planes than the Germans can gather within the next eight months the war will be quickly won. This is the opinion of Captain Giuseppe Bevione, Chief of the Italian Military Mission of Aeronautics in this country. Italy, said Captain Bevione, is now producing 1500 airplane engines per month, and will produce more than 2000 engines per month before the end of this year. The most important engines used for fighting airplanes are the A-1, sometimes called the Balilla, developed from the S. V. A., and the Pe Gamma, which is an adaptation from the original planes of the Pomilio. Numerous first class scouting and day bombing machines have been built. Foremost among the Italian factories is the Fiat, building the A-12 engine, developing 300 hp., and the



Side view of the S.I.A.-9B. This machine is used for day bombing



The S.I.A.-9B, equipped with the largest engine in the world, the Fiat 700 hp. Note the gasoline tanks on the under side of the upper planes

A-14, developing 700 hp., the latter being the latest powerful engine now used at the front.

Following is a statement by Captain Bevione on the aviation work of the Italian Air Service, together with the raw-material needs of Italy, for which she looks to this country:

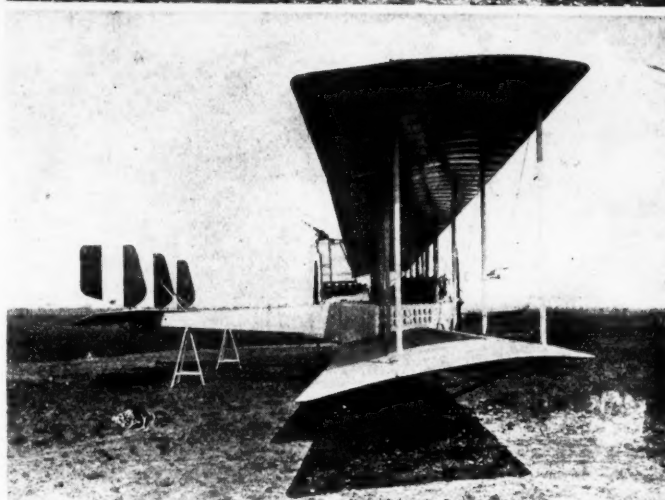
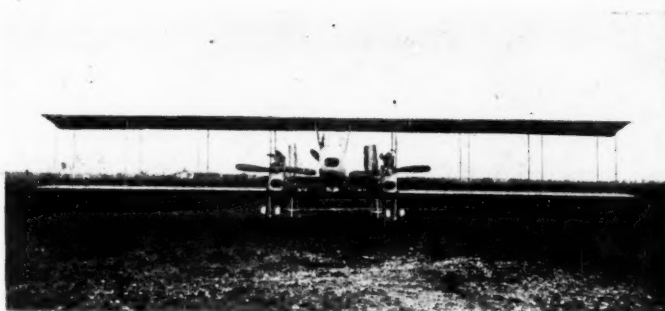
"Everybody knows that the war industries of all the allied nations, and particularly the industries of aviation, draw from America the essential part of the raw materials they use.

"The magnificent victories of the allied armies in these last few days, which have added so much glory to the American name, make us wonder at the splendid results that might be obtained were we able to realize that which we most need now, a supremacy of the air, so as to pursue the retreating foe with our squadron of airplanes, spreading terror and disorder among his lines and destroying and closing railway junctions, roads, and bridges and trestles.

Can Produce Air Fleet Ten Times That of Enemy

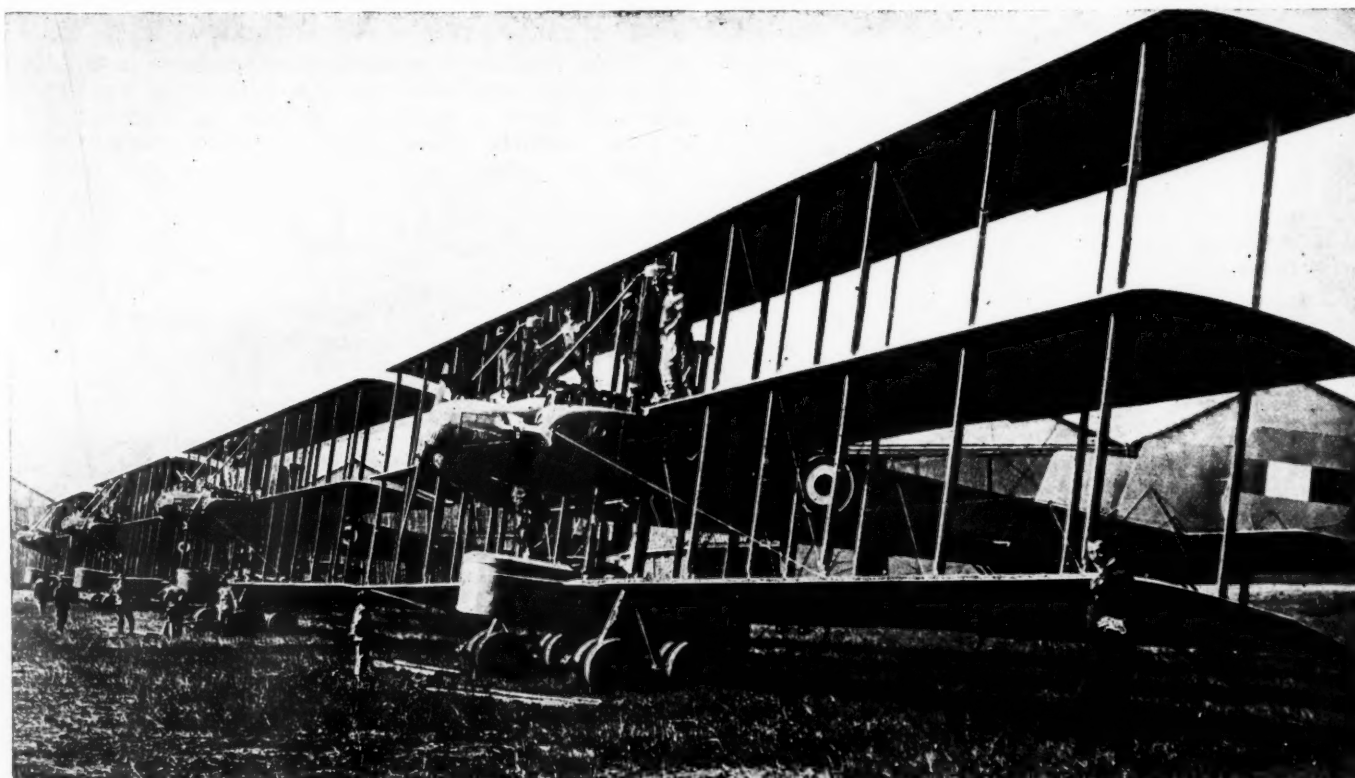
"As far as raw materials, industrial organization and man power are concerned, the Allies can produce and equip an aerial fleet at least ten times larger than that of the Central Powers. If this result can be obtained in 1919, if within eight months the Allies, with this country, can count on having in Europe 10,000 aeroplanes more than the enemy and will make them serve their purpose skillfully and inexorably, the war will be won. The foe's power of resistance would be struck at its very vital source, at its center of supplies, at the great factories of arms and ammunition, and bridges, railways and roads through which the armies at the front are kept in fighting trim.

"But in order to carry out this simple plan in its entirety (as nothing decisive could be attained unless it were developed fully), all of us, governments and peoples, must be aware of the absolute and obvious fact that the aerial army is of the greatest import, and that aviation



Two views of the Caproni biplane which is equipped with three 300-hp. Fiat engines and is considered the best bombing machine. It is used for day and night service on all of the allied fronts. America has adopted it and is building it equipped with the Liberty engine. This plane is known as model C.A. 5

can give us a formidable contribution toward the refusal of any peace compromise that Germany and Austria



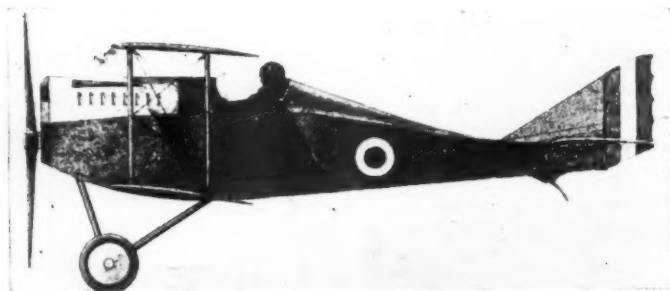
A group of Caproni triplanes equipped with three Fiat engines each of 300 hp. They are used for night bombing



A view from the rear of a S. V. A. pursuit plane, showing the cockpit of this unique Italian product

may try to impose on us. Aviation is a sure means of victory, and to it we must devote without hesitation and without reserve all of our efforts and best resources.

"I am betraying no secret in assuming that the closest



The Ansaldo, a special adaptation from the S. V. A., a very speedy Italian plane with exceptional maneuverability. It is equipped with a Spa engine of 240 hp. and attains a speed of 147 m.p.h. It is a single-seater

agreement has been reached on this fundamental point between the American authorities in charge of the industrial and technical development of aviation and the Italian Commissioner for Aeronautics. The latter has been such a vigorous incentive to our aviation industry that he has brought it within a few months to its magnificent development, well deserving of far-reaching results. But in order to have an unlimited output of its powers of production, Italy is obliged to seek from this country an adequate and continually increasing quantity of raw materials, metals, wood and textile matter. It is an absolute necessity that we obtain such assistance from the American government, in perfect harmony, of course, with the need of our allies, and for this purpose I was sent to Washington and appointed chief of the Italian military mission for aeronautics.

"I will endeavor to develop my program in the most logical and persuasive manner, proving to the Federal authorities that Italian aviation is well worthy of the assistance it is demanding of the generous and powerful American nation.



The Pomilio, one of Italy's reconnaissance machines which is equipped with a Fiat 300-hp. engine



The S.I.A.-7B, equipped with a Fiat 300-hp. engine. This is another of the reconnaissance machines being used by the Italian armies

"I will show how efficiently raw materials that have been provided us are being utilized, and I shall keep the men in charge of American aviation in close contact with every progress and acquainted with the great expectations that are in store for our Italian aircraft production.

"This progress is indeed remarkable, and every Italian can justly be proud of it. Italy to-day has overreached the critical period of experimental research and of uncertainties, always to be overcome at the beginning of new enterprises.

"To-day Italy is supplying its own needs in motors and planes entirely, besides using its own original types of planes; and within a few months all the planes flying at the Italian front will be of Italian manufacture and design and equipped with Italian motors.

"It is generally known that military aviation needs four types of planes—fighting, scouting, day bombing and night bombing. As to fighting aeroplanes, we now turn out two splendid types—the A-1 (so-called "Baililla"), developed from the S. V. A. of the Ansaldo factory, and the "Pe-Gamma," from the original plans of the Pomilio works (recently taken over by the Ansaldo factory).

"As to the other types of planes for warfare, Italy is well provided with models of her own, which are pro-

duced in large quantities. We have, in fact, two types of scouting craft of high value—the S. I. A.-8B (developed from the former 7B type), made by the S. I. A. factory, which is a branch of the Fiat, and the P. F. of the Pomilio factory, which, as previously stated, has been incorporated into the Ansaldo works.

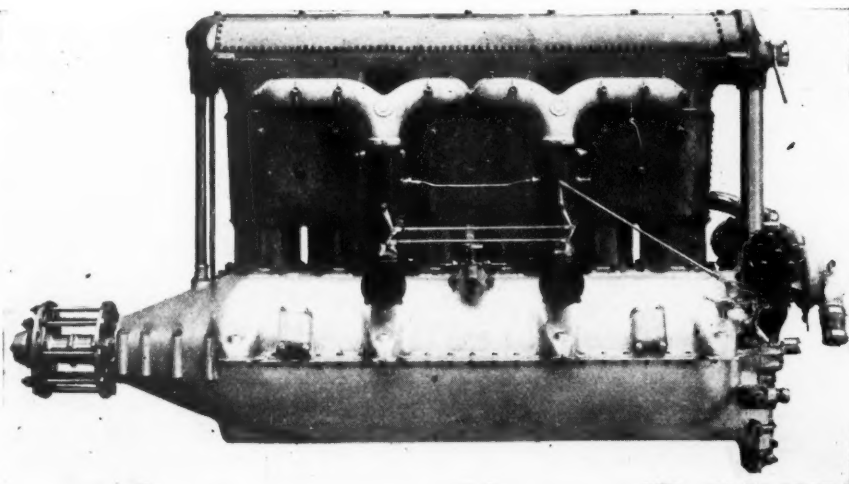
"Two important raids were performed last year by the S. I. A.-7B aeroplane; that is, the flight from Turin to Naples and return, 1,004 miles, without landing, and the Turin-London flight, 700 miles, with the crossing of the Alps.

"For day bombing, where speed and great power are essential, two Italian planes are ready to-day that already have undergone the most severe tests. One is the S. V. A. built by the Ansaldo factory, which can be used also for fighting and scouting, and already has accomplished the bombing of Innsbruck, besides performing the raid on Friedrichshafen. The second plane is the S. I. A.-9B, equipped with a Fiat engine of 700 hp. This, owing to its speed and great power, can be flown over long distances and can be used in broad daylight bombing.

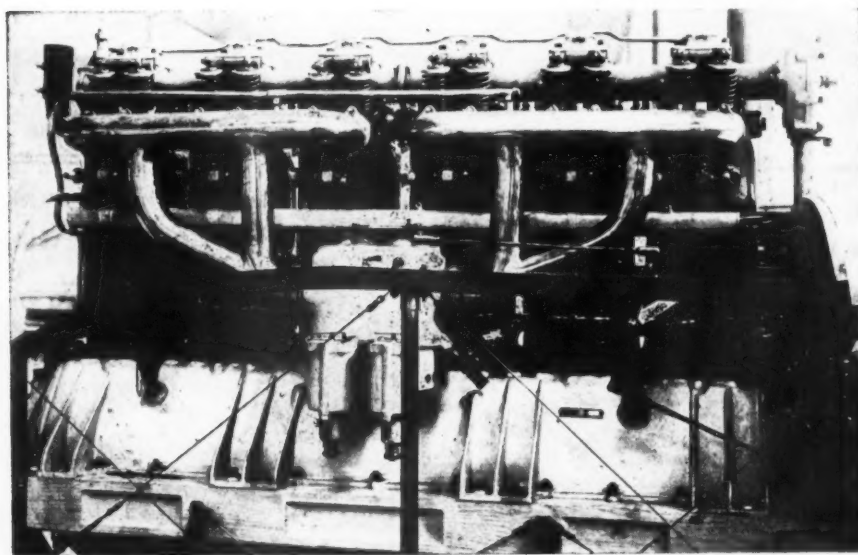
"For night bombing there are the biplane and triplane Caproni, now of international fame. The larger model of Caproni biplane, CA-5, equipped in Italy with three Fiat motors of 300 hp. each, is without doubt superior to all similar types in existence, so much so that all of our allies—American, British and French—have adopted it, and at the French front several Italian squadrons of Caproni are in active service, adding new records to their well-established reputation. It is known to-day also that at Mineola, Long Island, the first Caproni built in the United States, equipped with Liberty engines, has gone through its tests with the greatest success and that the Federal authorities have placed with American firms large orders for Caproni-Liberty aeroplanes.

"I firmly believe that Italy can be proud of its aviation achievements and victories, as on the sixteenth of last June, the first day of the ill-fated Austrian drive on the Piave, 34 Austrian airplanes were downed, and only two of our planes were reported missing.

"But no aeroplane, perfect as may



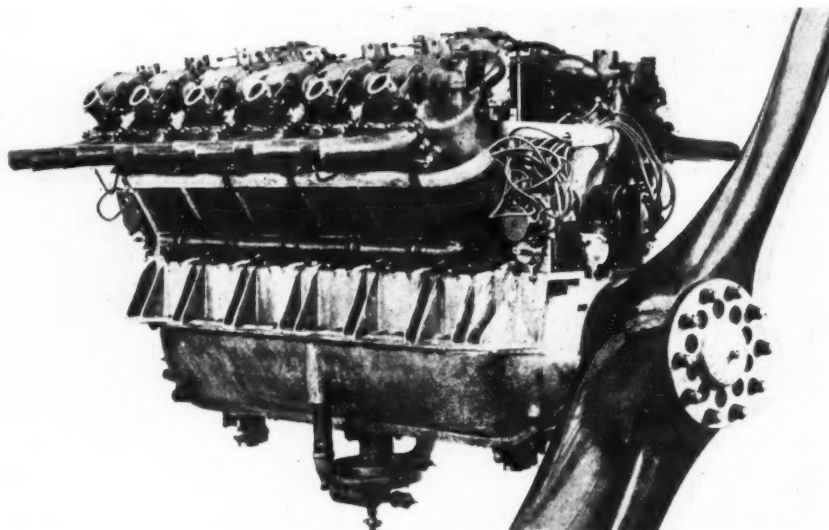
Italian Airplane Engines—The new Isotta Fraschini, known as type V-6. This engine has 300 hp.



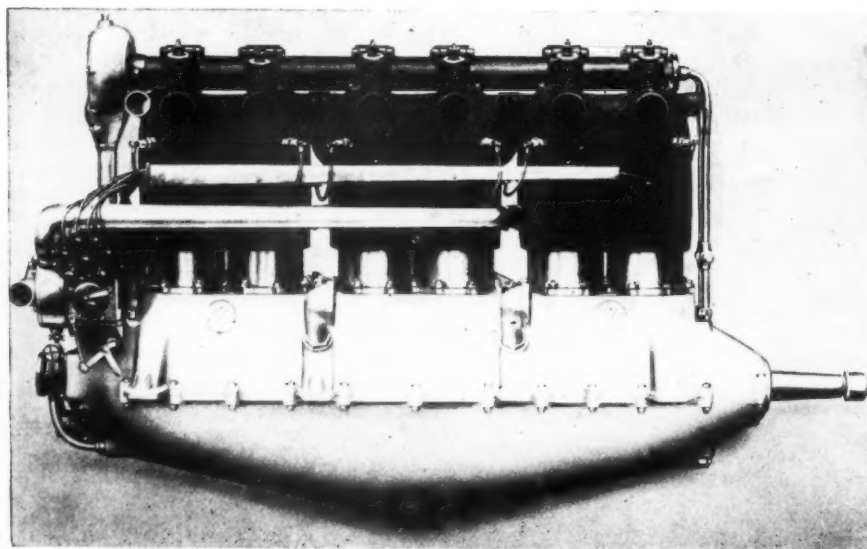
Italian Airplane Engines—The Fiat 300-hp. engine; six-cylinders

be its design and construction, could be of any service if not equipped with the best and most reliable motor. The capacity for production of the factories connected with the manufacture of aircraft must be equal to cope with the demands for the keeping up of the full efficiency of the aerial force. And here, again, Italy's efforts have met with success.

"The Fiat factory stands first as one of our largest manufacturers of aviation motors, with her two well-known engines, the A-12 and the A-14. The A-12 develops 300 hp., and the A-14 700 hp., this being the most powerful motor used at the front for aviation by any of the Allies. The Fiat has a remarkably large output of these engines, and I regret that for obvious reasons I cannot give the exact figures concerning it. But I can say that our aeronautical department which buys all this production, after having met with all of our own requirements, can afford to supply



Italian Airplane Engines—The Fiat 700-hp. engine, twelve-cylinders, the most powerful airplane engine in the world



Italian Airplane Engines—The Spa engine; 240 hp.

the Allies with an important number of these motors daily, in compliance with their urgent demands. Besides this, the Fiat now has ready a new model, which will be produced soon in large quantities. This is the A-15, of 450 hp., greatly reduced in size from previous models, light, accessible and possessing new and important characteristics that undoubtedly will cause a further and greater development of our military aviation.

"In addition to the Fiat, we have the Spa, of the well-known automobile factory of that name, which, with some important changes and only a slight increase in weight, has been able to develop its old 220 hp. motor into a new 300 hp. motor, without being obliged to change its equipment and machinery, thus achieving a great technical and industrial success and producing a new engine of slight weight and great power. These motors already are being turned

out in large numbers, and will be of the greatest value to aviation, especially fitted to fighting planes.

"Another important factory, the Isotta-Fraschini, produces high-grade planes that have won reputation for their reliability and perfect workmanship. Here again a new motor is ready, the I-F V-6, developing 300 hp., greatly appreciated by both airplane manufacturers and pilots.

"The following figures may give a more correct idea of Italy's effort in the production of aviation motors: 1500 motors a month is the present output; before the end of the year we certainly shall produce more than 2000 motors monthly, which means the astonishing figure of 24,000 aviation engines a year, all of Italian design, of Italian construction, all of high repute, established after the severest tests. Yet at the beginning of the war Italy possessed not more than 100 aeroplanes and less than 100 pilots."

Training 150 Operators Per Week

How the Vestibule School of the Remington Arms Co. Is Meeting the Demand for Skilled Workers of Both Sexes—How Operatives Are Routed Through the Plant

UP to the first of July 565 student employees had been instructed in the training department or vestibule school of the Remington Arms Union Metallic Cartridge Company at Bridgeport, Conn. Of these student employees 390 were male and 175 were female operatives. The school is now training approximately 150 students a week, starting 50 each Monday, another lot of 50 each Wednesday and as many more each Friday. It requires two days on the average to train these students. Some of the very simple operations can, however, be taught in a day, while in the case of certain others it takes several days to give the operatives a sufficiently high degree of skill.

There are fourteen regular instructors in the school, but as the work is to be materially extended and new machines are to be installed, it is estimated that twice as many will be required within a short time.

The company has a reserve list of instructors who are either expert operators or adjusters. These men are posted at various points throughout the shop and are ordinarily to be found at their regular occupations, but when it happens that there is an overflow in the school, the extra students are sent to these instructors for training.

The instructors themselves are carefully trained so that they may be thoroughly competent to teach, and they are selected for this work because of a natural aptitude for imparting knowledge.

Except in a few special cases, male student employees receive 35 cents per hour flat rate for 8 hours' work. This means that they get \$3.85 for a 10-hour day, as they are paid at over-time rates for time work over 8 hours.

The work of the school is supervised by the Educational Director, who looks after all educational work in the plant. Besides the vestibule school, the company also conducts a toolmaker apprentice 4-year course and a machinist apprentice 3-year course. Apprentice courses are conducted according to the well known corporation school plan.

The School Lay-Out

The department set aside for this school covers a floor space 62 feet wide by 128 feet long, and is laid out as shown on the accompanying sketch.

Machines are set up on both sides as one enters. There is sufficient room around each machine to allow a group of about 6 students to stand without interference. This is necessary because each instructor usually has 5 or 6 students under instruction.

In the center of the room is an inspection crib where the finished work is brought and inspected by students. At the left is the office where the Supervisor and his clerks are stationed. At present, 2 clerks are required besides a timekeeper.

In the far corner is a lecture room, separated from the machine department by a double partition to eliminate as much noise as possible. The lecture room is

fitted with a platform and lecture room chairs of most approved type. Here the students are introduced before starting to work, the policy of the company is explained to them and a general talk on safety, health and responsibility is given them. They are then divided into

How the Remington Company Introduces Itself to New Employees

YOU have offered to sell your services to the Remington Armory, at Bridgeport.

The policy of this Company is one of great value to you, it is one in which FAIR DEAL plays an important part. Reduced to its simplest form it amounts to this, "The Company is anxious to help those who will help themselves," and in return expects good SERVICE and LOYALTY.

We want to educate you to do your work in the best manner possible so that it will be easier for you, give you better financial returns, and moreover, it will cease to be drudgery and eventually its faithful performance will become an inspiration to accomplish bigger and better things.

So frame your mind that you will look upon your employer as your friend, be determined to use your head at least as well as your hands, to always use your head first, and then do your work after you know the WHY of everything about it that concerns you.

Instruction sheets will be given you to study carefully. If any of this information is already familiar to you, it will only be necessary for you to read it over carefully. Information that you are not acquainted with, must be studied carefully, so that you may eventually be able to answer questions on any topic contained in these instruction sheets.

Your rating will be greatly influenced by your ability to answer questions relating to your work and these instructions.

If, after working at any job, you find that it is not to your liking or that you are not capable to do the work, do not lay down on it, but make the best of it you can, and speak to your superior about your case. If you "throw up hands" you not only make yourself unfit for your present job, but you lessen your chances of being given another job on the ground of incompetency.

Before transferring to another job, it will be necessary for you to qualify for the new work that you expect to take up.

To many workers, the other fellow's job looks better to them than their own. Do not allow this feeling to make a slave of you, as you cannot be highly efficient while under this influence. Stick to your job and master it well, then the bigger job will find you.

A hard day's work is not necessarily a good day's work. Knowing how to do the work well, will convert a hard day's work of ordinary success into an easier day's work of better success, because you will become EFFICIENT by reducing lost time and lost motions all you can.

TRANSFER RECOMMENDATION

To EMPLOYMENT DEPT.

Name _____ Date _____

Present Occupation _____ Dept. _____

To Dept. _____ As _____ Rate _____

Reason for Transfer: _____

Approved: _____

Superintendent Employment Clerk

RA-B-462

This form is used in transferring employees from one department to another and is sent to the employment office with the employee to be transferred

groups and assigned to the various instructors, who take them to the machines.

All the machines in the school are kept in first class order and the room and everything and everybody in it kept very clean and orderly to give the best possible first impression.

There are some cases where men cannot be trained on the machines for which they are requisitioned, because that kind of machine is not in the school. In such cases,

RECORD SHEET

NUMBER _____ DATE _____

TRADE OR FORMER OCCUPATION _____

HEIGHT _____ WEIGHT _____ AGE _____ SIGHT _____

HEARING _____ INTELLIGENCE _____ COLOR OF EYES _____

COLOR OF HAIR _____ PHYSICAL DEFECTS _____

GENERAL APPEARANCE _____

PHYSICIAN'S REPORT _____

HAS ALREADY WORKED HERE YES NO

AT WHAT _____

FOR HOW LONG _____

TRANSFERRED FROM _____

QUIT OR LEFT _____ WHY _____

- TESTS -

NUMBER OF TESTS	501	502	503	504	505	506	507	508	509
TIME									
MARK									
MACHINES TRAINED ON									
"									
"									

SCHOOL REPORT:

ADAPTABILITY	SPEED	QUALITY	CONDUCT	ATTENDANCE

FROM GENERAL OBSERVATION IN THE SCHOOL, THIS OPERATOR SEEMS:

VERY GOOD GOOD (Check one)
FAIR DOUBTFUL

DATE OF TRANSFER TO SHOP _____ DEPT _____

FOREMAN _____ DATE _____

REPORTS:

ADAPTABILITY	SPEED	QUALITY	CONDUCT	ATTENDANCE

EO. Form-401

A permanent record used chiefly by the employment office. At the bottom is entered a copy of the foreman's report after the employee has been working for him 12 weeks. The information contained on this card is used in considering promotions and in checking results of psychological tests and efficiency of training methods

men are trained on an operation nearest in nature to that for which the operator is requisitioned.

Arrangements are previously made in the Employment Office so that men hired to be trained can start right in early in the morning without delay. They are sent to the school where they are given a small slip of paper bearing a temporary number. This is to identify them until they are assigned a number by the timekeeper. As soon as possible, the timekeeper makes the necessary records, number assignments, inscriptions on the passes and time cards. The passes and time cards are then distributed to the new employee.

The first instructions are given collectively. A class of newcomers are gathered in the lecture room in the school and the Supervisor gives them general instructions as mentioned above. While the instructors cannot use a cut-and-dried method of teaching, yet they have been taught to follow, in a general way, the written instructions given them. These are contained in a set

THE REMINGTON ARMS UNION METALLIC CARTRIDGE CO., INC.
REMINGTON BRIDGEPORT WORKS

REQUISITION FOR HELP

DATE _____

BUILDING No. _____ FLOOR No. _____ DEPT. No. _____ SHIFT _____

NUMBER WANTED	KIND OF MEN WANTED	DATE	RATE APPROXIMATE

STATE ABOVE NATURE OF WORK TO BE DONE

MAKE OUT SEPARATE REQUISITION FOR EACH KIND OF MEN WANTED

APPROVED _____ ASST. FOREMAN
APPROVED _____ FOREMAN
APPROVED _____ SUPT.
APPROVED _____ WORKS MGR.

Front and back of form "requisition for help" used by foremen in obtaining transfers from the school or other production departments

of neostyled sheets, about 30 in number, including the following headings:

- Introductory.
- Description of Operation.
- Description of Machine.
- How to Operate the Machine.
- Description and Use of Drop Forgings.
- Description and Use of Cutters.
- Description of Pump System.
- Description and Use of Gages.
- The Operator (Human Factor).
- Method of Instruction.
- Importance of Little Details.

The substance of these instruction sheets is used by the instructors as a basis for their talk to students. After the introductory has been covered, the students are taken to the machines which they are to operate, so that any reference to the machine or apparatus can be supplemented by actual demonstration.

The instructor performs the operation a few times, then coaches each student to do the same, after which the students take turns at operating the machine. While one is operating, the others pay strict attention all the while.

When the student can answer questions to the in-

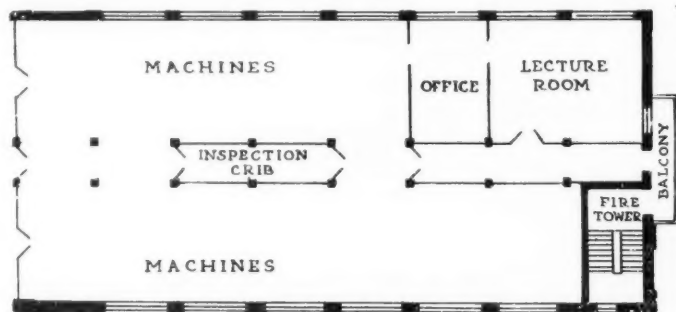
structor's satisfaction and can operate the machine properly, he is competent to be sent to the production department.

Men learning to become adjusters must first go through practically the same course as operators, especially if they are not acquainted with the operation of the machine which they are to adjust. But they must become much more competent to operate and then they are taught how to make adjustments of the machine parts and groups, also those of the tools and fixtures.

They must become able to make any adjustment required to change the dimensions of the component when these do not match the gages. They must also be able to answer the instructor's questions satisfactorily before being released. Records of their performance, both in and out of the school, are kept in the same manner as those of the operators.

When machine operators are needed, the foreman or supervisor must issue help requisitions for them on the school. These requisitions must not be made for more than two operators. Therefore, if ten operators are required, five separate tickets must be made out.

If men are already trained, the requisitions will be



Plan view of the Remington training school, showing the inspection crib, office and lecture room

immediately filled, either in part or entirely. When there are not a sufficient number of operators already in the school, the unfilled part of the total requisition will be sent to the Employment Office for material to be trained. As soon as these men are trained, they are supplied to the department which asked for them.

The machines that are in the school represent only such kinds as are used in large numbers in the shop, and can be isolated for instruction purposes.

The operations for which the school is now fitted are:

Milling—Hand	Shaving
Milling—Power	Tapping
Milling—Thread	
Profiling	Press—Foot
Polishing	Press—Power
Barrel Drilling	Hand Screw Machine
Barrel Turning	Bench Work
Barrel Chambering	Inspection
Barrel Grinding	Adjusting
Drilling	

The instructors keep a daily record of the students' performance, on a $\frac{5}{8}$ -in. card form for that purpose. When the student is transferred to the shop, a permanent record is made on an $8\frac{1}{2}$ in. x 11 in. card for that purpose. After twelve weeks, a report is made by the foreman of the employee's performance, which is also incorporated on the permanent record sheet, this being kept in a file for reference. This record also has other information which may be useful in placing the employee properly and determining the ultimate result of training operators.

The routing of employees between departments and to and from the school is handled in the following manner:

1.—Ordinarily, transfers are effected in accordance with instructions, using the form "Transfer Recom-

DAILY REPORT					
NAME _____			NO. _____		
DATE	ADAPTABILITY	SPEED	QUALITY	CONDUCT	ATTENDANCE

Form used by instructors to keep record of students' performance while in school

mendations," provided for the purpose. This is made out in the department from which the operator is going, is signed by the section supervisor or superintendent, and is forwarded to the employment office with the transferring operator.

2.—This operator is then assigned to any department whose "Requisition for Help" may be on hand at the employment office. If possible, the operator should be put at work similar to that which he had been doing, to avoid the necessity of training again.

3.—The transfer from one department to another of an operator requiring training in the school.

If the operator cannot be put at work for which he is trained, he will be sent to the school for training. He will be on the payroll of the department to which he is transferred and not on that of the school.

4.—Transfer of an operator from the school to a shop department.

An operator who is on the school payroll must be transferred from the school to another department in the regular way, as described in paragraphs 1 and 2.

5.—The assignment by the employment office of an

FROM:	Operators Training School, HSE.		DATE
TO:			
SUBJECT:	Report of Operator's performance.		
Please fill out the blank below, using the key as a guide, and return promptly to HSE in order to enable that department to keep a record of the employee whose name appears here.			
Operator _____		No. _____	Shift _____
was released from the school and sent to you on (date) _____			
Adaptability	Speed	Quality	Conduct Attendance
%	%	%	% %
Key:- Excellent	95 to 100%	Fair	80 to 85%
Very good	90 to 95%	Passable	70 to 80%
Good	85 to 90%	Cannot pass	Below 70%
If for any reason, you place this employee at different work other than that for which he was trained, please give reason and all particulars here:			
Foreman's Signature _____			

EO-Form-405

The foreman's report made out for each trained employee after 12 weeks in the production department

operator who has been requisitioned by a shop department to the school.

This can be effected as described in paragraph 3. As soon as the operator is trained for the work he is to do, or has proven that he can already do his work properly, he is then released to his department of assignment without formality.

6.—The assignment by the employment office of an operator to the school who had not been requisitioned by a shop department.

If the Employment Office wishes to hire a person who shows decided aptitudes to become an operator, yet has no place to send this person at the time, that person may be assigned to the school for instruction. In this case the employee is hired for the school outright and is on that payroll until transferred to a shop department.

7.—Training of an operator already working in a shop department who will return to the same department after training.

An operator requiring instructions may be sent to the school for additional or different training, and then back again to his department without formality, except verbal, phone or ordinary written notice from the foreman to the instructors in the school. This operator remains, of course, on the shop department payroll.

8.—Emergencies.

In an emergency, one or more operators (partly trained or otherwise) may be hired or transferred from one department to another, or from the school to shop departments without formality, but this should be done only when it possibly cannot be avoided, and the necessary regular routine forms should be made out.

An Improved Chain Track for Tractors

Employing a Guided Rocking Joint with Dust Excluder and Inclosed Track Carrier—A Chain of Sheet Steel Sections

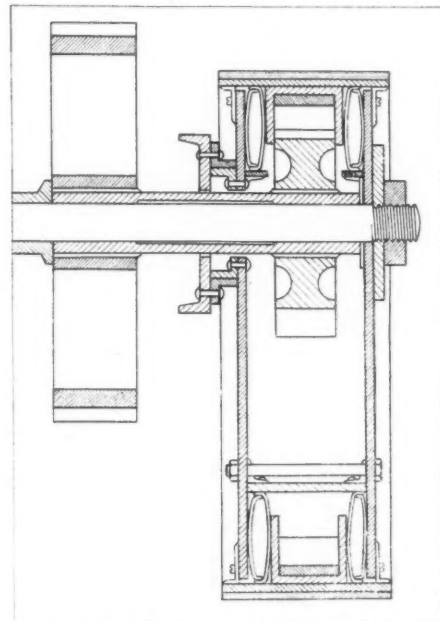
AN improved design of chain track for tractors has been developed by Ralph Wishon of 730 Eddy Street, San Francisco, Cal. Knowing the effect of dust and grit on the usual link and pin type of chain, Mr. Wishon set out to do away with pins. He achieved this object by the use of a properly guided rocking joint with dust excluder and of an inclosed track carrier. The chain is composed of sheet steel sections each built up of three pieces interlocking with each other and securely riveted together as the chain is assembled, bolts being used at the master links. The tread piece is made with an overlap to exclude dust. The shroud piece prevents lateral movement and bending movement, except from a straight line inward; it acts as a guide for the rocking joint and a smooth contact and guide for the rollers.

The hook piece has a small hook at one end for engaging the next or following section and a larger U-shaped hook at the other or forward end which also acts as a tooth for engaging the driving sprocket. The track is mounted on two rows of pressed steel rollers running on a raceway of sheet steel secured to two angle iron frames, except at the forward end, which is free to act as a chain tightener and spring, supported after passing through the angle iron frames as shown. This plate is also slotted to pass the driving sprocket. The raceway plate is held in place by two outside plates just clearing the tread all round and secured by through bolts as shown.

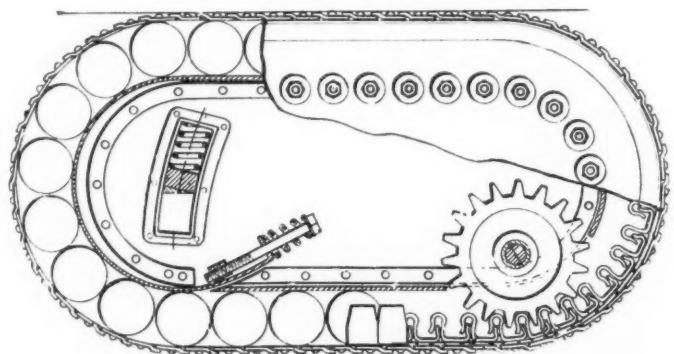
An arc-shaped casting is let into these plates and when the track carrier is mounted on the frame it is slipped over the end of a heavy rectangular bar which is bolted across the frame, and springs are inserted under the bar to take the weight of the main frame and permit the track carrier to oscillate on the trunnions. The track carrier is further guided in its vertical movement between two hard wood blocks as shown. The rear end of the track carrier has a trunnion ring riveted concentrically with the driving sprocket and fitting inside another ring which is riveted to the main frame. A heavy through shaft is threaded at each end for a nut and passes through both track carriers, the main frame holding the carriers securely in place, although allowing an oscillating movement. This shaft also acts as a bearing for two bronze sleeves, each of which carries a driving sprocket and a main drive gear, both being fitted to the sleeves by six loose fitting keys acting as splines. The sleeves are held in place by a spacer in the middle and by washers in each outside end.

The whole assembly may be dismantled by removing a nut from one end of the "through" shaft and withdrawing the same from the other side. The track, as shown, can be modified by change of pitch, width and supporting contact, as in

the case of the truck wheel type of track carrier, the flanged wheels of which may travel on the upturned edge of the shroud piece, which may overlap if necessary.



Vertical section through chain track



Showing self-adjusting track for chain rollers

Diffusion of Manufacturing Will Solve Many Industrial Problems

Breaking Up Centralization and Congestion in Urban Communities Will Benefit Labor Conditions—More Work for the Motor Truck

A MOST alluring picture of the benefits to be derived from a diffusion of manufacturing from the cities where it has become centralized to the rural sections of the country is drawn in a statement just issued by C. C. McChord of the Interstate Commerce Commission, who has been named by President Wilson as one of the umpires of the National War Labor Board. The benefits which the commissioner foresees as coming from such a readjustment are not only industrial but also national through a raised standard of citizenship.

Mr. McChord offers his suggestion as a plan calculated to go far in solving the many problems of labor, the distribution of materials and the cost of living after the war. And in the accomplishment of the plan, although Mr. McChord does not emphasize the fact as strongly as he might, the motor truck will play a most important part. Scatter our manufacturing evenly over the country and throughout the rural regions to the greatest practical extent and the need for motor trucks will be greater than ever before. We give an abstract of the commissioner's statement in the following paragraphs.

A Radical Change Needed

What is needed in this country is a wider diffusion of manufacturing industries and the local supply of the necessities of life. Products of our factories are distributed throughout the land, but under circumstances of such economic waste as to demand a radical change. In the development of manufacturing many elements have conspired to confine factories to limited territories or particular cities. Among the chief of these was the fact that the railroads favored certain manufacturing centers in the way of facilities and rates.

While the payment of rebates that found their way into carriers' accounts ceased on the passage of the amendment to the Act to Regulate Commerce of 1906, and many carriers had ceased to make such payments previously, the matter of preferential rates and the furnishing of superior facilities to competitive centers continued with unabated vigor until the taking over of the railroads by the President on Dec. 28, 1917. That event was intended to bring about a complete change. Railroad managers were at first reluctant, and in fact some have not yet fully accepted the fact that each road is no longer a competitor of the other, but all are engaged under Federal control as a great unified system in the business of transporting the necessities of war and the commerce of the country. The change was as startling as sudden. Preconceived notions of the rights of each carrier as against the other, and their relation to the public, were changed over night.

It seems to be conceded by every one that, no matter what is done with respect to the great transportation systems of the country after the war is over, certain condemned practices and the unbridled competition of past years are at an end, and that by some means the carriers of the future will be under such regulations as will insure the largest and most effective use of the facilities they have for the conduct of the transportation business of the land without favor to one shipper or prejudice to another.

Railroads Must Help

The most important matter just now, however, is the part that the railroads should play in the readjustment that must be made in our industrial and economic conditions. As be-

fore noted, it has come about that the large part of our manufacturing is done in our cities. The greatest manufacturing cities of the nation, considering the variety and quantity of production, are Chicago, Ill., and Philadelphia, Pa. Southern New England has developed into a succession of manufacturing cities. Pittsburgh dominates the iron and steel industry and controls prices wherever sales may be made in this country, as Chicago dominates and controls the prices of meats and their products. New York City produces immense quantities of ready-made clothing, employing thousands in sweatshops of unsavory surroundings. The result is that workmen and women in largest numbers live under conditions that are not sanitary, wholesome nor conducive to good morals. This has happened in a country that is less densely populated than any of the great nations of earth, and where there is room enough for every citizen and resident to enjoy his full share of pure air and sunlight, and to live under conditions conducive to health, morality and happiness. It would also enable him to secure a home at moderate cost, or at reasonable rental, with an area of ground sufficient to permit him to cultivate a garden where fresh vegetables may be grown for his own use.

There are many other considerations that dictate a re-location of our manufacturing industries. In the first place it costs more to do business in a city than in the country. Land values and costs of construction of plants, taxes, etc., constitute charges that must be met from earnings. It costs more to live in a city than in the country. A lower wage payment in the country than in the city would enable the workman to secure more comforts of life, to clothe his family better, and educate them more adequately. If the factory is located near the raw product there is saving in transportation costs which will be reflected in net earnings.

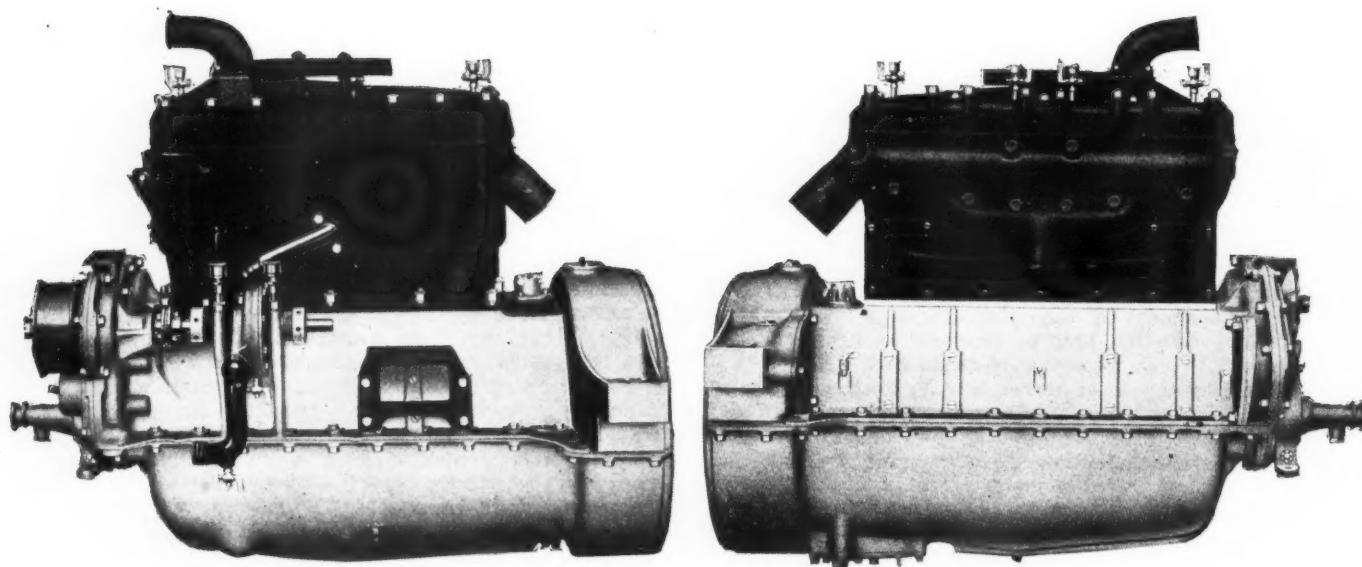
Recent Developments

In very recent years there has been here and there a man whose vision has been broad enough to see what it is the consuming public demands, and has attempted to meet it. One concern has in recent years by co-operation with residents induced the building by local capital of hundreds of flour mills at country points in the Middle West and South, which supply consumers in the region round about each mill with flour, meal and feed. Another man owns in his own right many branch houses for distribution of groceries, merchandise and general household necessities. He ships to the branch houses in carload lots and distributes to his customers in motor trucks. He is doing a large and thriving business. Both of these institutions are representative of a class that has recently come into existence.

Does not the public demand which these institutions seek to meet point the way to a solution, in part, of the reconstruction problem that now confronts us? If wage scales are to be readjusted downward to meet conditions in times of peace, the wider diffusion of factories presents an alluring way out. What the workman desires, and what he has the right to demand, is opportunity to live in comfort. Reduction in the rate of his daily wage means, as he now sees it, lessened opportunity to secure to himself and his family those necessities which go to make comfort in daily life. In most any country town of 1500 or more population that might be named in the Middle West or the South there is opportunity to live better and enjoy more of the real comforts of life, at materially lower wages, than even an approach to the same state of livelihood can be secured in any congested manufacturing center.

Buda Model "HTU" Engine

Designed for Truck and Tractor Service—Has Detachable Cylinder Head and Force Feed Lubrication—Special Crank Base Construction and Heavier Flywheel for Tractor Use—Vaporizing Manifold for Burning Kerosene



The Buda model "HTU" is designed to operate on low-grade gasoline and kerosene

AN engine specially designed for heavy duty service has just been brought out by the Buda Company of Harvey, Ill. It embodies some of the features evolved by the Buda Company for its automobile engines, but is designed to take care of the severe working conditions in tractor service. The Buda Company has been supplying engines to tractor manufacturers for several years, and has made a thorough study of the requirements in this exacting service. The situation in the fuel market has been taken into account, and the engine has been designed to operate successfully on the present low-grade gasoline, but where desired it can be furnished with a specially constructed manifold for operation on kerosene.

The new model HTU is a four-cylinder block-cast engine of 4¼ in. bore and 5½ in. stroke. No power rating is given, but it may be stated that this size of engine (312 cubic inches piston displacement) is about that usually employed on three plow tractors.

The cylinders are cast in a block, with detachable heads, and are finished by grinding. Voluminous water jackets surround the entire combustion chambers, and the water space is baffled so as to compel the water to flow over every part of the flame-swept surfaces and cause it to be discharged directly beneath the valves. In the cylinder head provision is made for a large number (21) of closely spaced studs, to insure uniform pressure on the copper asbestos gasket and thus prevent leakage. Particularly large water spaces are provided on top of the cylinders. The spark plugs are screwed into the cylinder heads, and their bosses are completely surrounded by water. S. A. E. standard ⅞-in. plugs are used. The water outlets on the cylinder head are fitted with removable outlet-elbows, which can be located at four different angles.

The cylinder base flange is extended to carry the valve lifter guides, which construction permits of completely enclosing the guides, valve lifters and push rods, and of making provision for oiling these parts by means of communication with the crankcase. The exhaust and inlet pipes are located

on the same side of the cylinder block, which facilitates the making of hot air connections for burning low-grade fuel.

The crankcase consists of two gray iron castings, with a horizontal joint through the crankshaft axis. All bearings are supported by the upper half, the lower half serving only as an oil pan. Lugs are provided on the crankcase for attaching a sod pan, thus eliminating the need for supports on the main frame. The crankcase and oil pan form a bell housing over the flywheel and will take any standard transmission suitable for No. 3 S. A. E. bell housing.

Special interest attaches to the oiling system employed. For truck purposes a single piece oil pan is employed, which is divided into an upper and lower compartment by means of an easily removable plate. This feature enables the oil reservoir to be thoroughly cleaned when required, with a minimum of effort. For tractor purposes a two part oil pan is provided, which gives easy access to the bearings for adjustment. Upon taking out a few bolts, the lower half of the oil pan can be removed. This part is provided with a settling chamber in which all abrasion from the bearings or any other solid particles may settle, and at the lowest point of this settling chamber there is a drain plug. A feature that will be readily recognized as of great value in a tractor engine is that the connecting rods and pistons may be removed from the engine without taking it out of the frame or disturbing any other parts.

The engine is designed for three-point support. There are two rear supporting arms cast integral with the bell housing, designed for main frame support. The forward end of the engine is supported by a trunnion, intended to rest upon a drop cross piece of the frame.

The engine being of the "L" head type, all valves are operated from a single camshaft, and the whole valve mechanism is enclosed. Valves of liberal size are employed, both sets having an effective diameter of 1⅞ in. The ends of the stems are hardened, and oil tempered valve springs are used. Valve stems and push rods work in separate removable bushings. A

removable cylinder sideplate covers the valves. Mushroom type cam followers are used.

The pistons are of cast iron, ground to size and provided with recesses and drilled with oil relief holes to prevent smoking. A balancing pad is provided in the piston casting, by means of which the weights of all pistons can be equalized. The piston rings are ground on the circumference and on both sides, and they have a diagonal cut. I-beam section connecting rods are used, of open hearth steel, drop forged and heat treated. The upper end of the rod is bushed with phosphor bronze and the lower end is fitted with a bearing consisting of a bronze shell and babbitt lining. Each connecting rod cap is held in place by four bolts, and the weights of all connecting rods are equalized.

Camshafts and cams are forged in a single piece of open hearth steel and are casehardened and ground. At one end of the shaft there is a flange to which the timing gear is bolted. The crankshaft is forged from open hearth steel, heat treated, machined and balanced on a Norton crankshaft balancing machine and drilled for the force feed oiling system. By means of the heat treatment to which the crankshaft is subjected, an elastic limit of 85,000 lbs. per square inch and an ultimate strength of 120,000 lbs. per square inch are obtained. The crankshaft has three main bearings, of the following dimensions: (front to rear) $2\frac{1}{2} \times 3\frac{3}{4}$, $2\frac{3}{4} \times 2\frac{3}{4}$, $2\frac{3}{4} \times 4$ in. The connecting rod bearings are $2\frac{1}{2} \times 2\frac{1}{2}$. Characteristic of the principles of design of this engine is the fact that the connecting rod's center to center length is $12\frac{1}{4}$ in., or considerably more than twice the stroke.

The set of timing gears, composed of four gears, one cam, one idler, one pump shaft and one generator gear, are made with extra wide faces ($1\frac{1}{2}$ in.) and are cut with helical teeth, a refinement which is usually considered unnecessary in tractor engines. The gears are hobbled and great pains are taken to assure accurate centers, so their operation should be practically noiseless. The gears are easily accessible upon removal of the gearcase cover.

All main bearings are of the bronze-shell, babbitt-lined type, while the camshaft bearings, three in number, are die cast babbitt bearings. All bearings are accurately reamed and scraped to a perfect fit. A centrifugal type of water pump is provided, having a large bronze runner. The water pipes are short and of simple form, and are so arranged that it is unnecessary to bend the hose. A fan bracket is cast integral with the gearcase cover and is designed for mounting a radiator fan driven by a 2-in. flat belt.

A cast iron exhaust manifold is used and is provided with an expansion joint at the outer end. The intake manifold is cast integral with the exhaust manifold, thus insuring the proper heat supply for burning low-grade fuel. A special

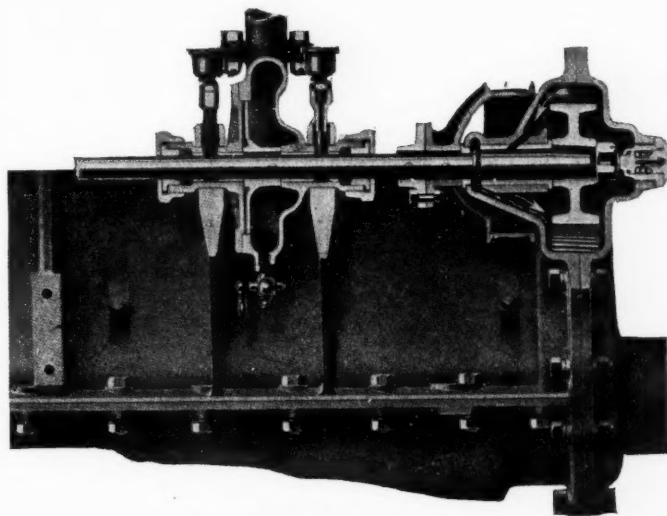
design of combination exhaust and intake manifold is furnished where it is desired to burn kerosene. Both manifolds of course are located on the same side of the engine block, and the inlet manifold is designed to take a $1\frac{1}{4}$ -in. vertical outlet carbureter.

The flywheel is secured to the crankshaft by means of six steel bolts passing through a flange integral with the crankshaft. The flywheel regularly furnished with the engine will accommodate any of the standard clutches used in connection with a No. 3 S. A. E. bell housing.

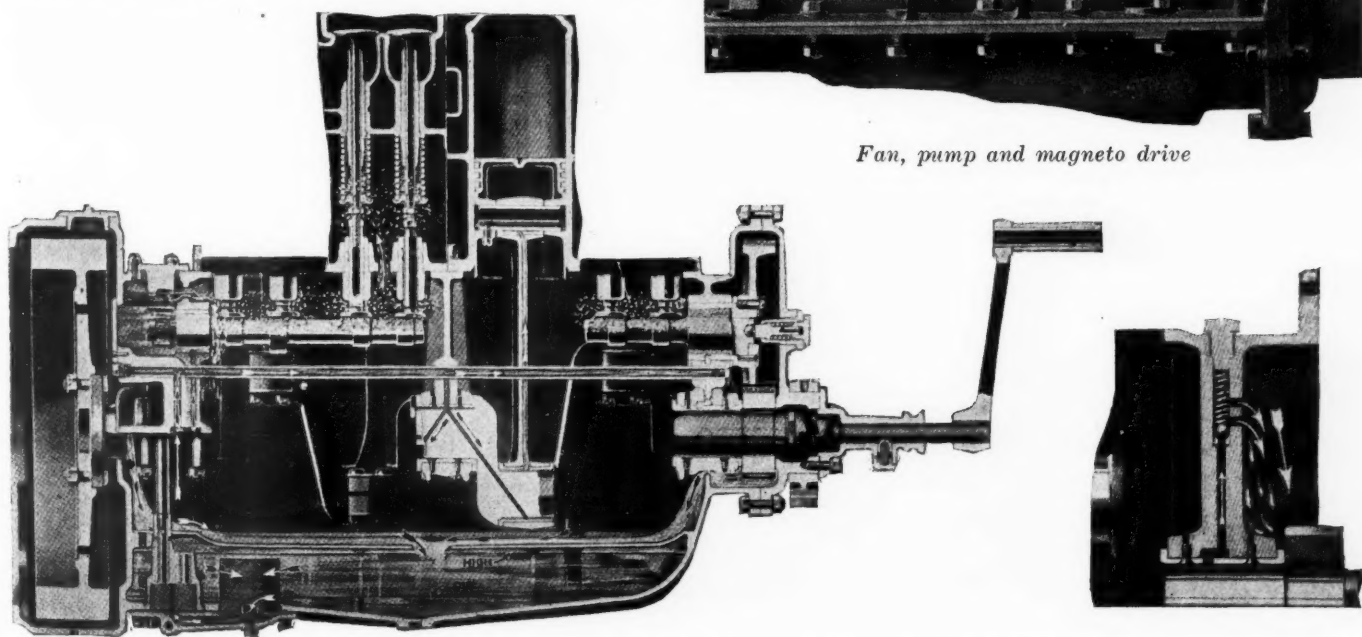
Lubrication is by full force feed to all bearings through a drilled crankshaft. This system is of the self-contained positive pressure feed type, with a pressure regulating valve, the oil being pumped from the oil reservoir, which is located underneath the crankcase, by a geared type pump and forced through a pipe to the main bearings, and from these through passages in the crankshaft to the connecting rod bearings. The camshaft bearings and piston pins are also lubricated through passages connected with the pressure feed system. The cylinder walls are lubricated by oil thrown off from the lower ends of the connecting rods. A special lead from the pressure system extends into the timing gear housing.

Almost any make of ignition, starting and lighting outfit can be readily mounted on the engine. The crankcase is arranged for No. 2 S. A. E. starting motor and lighting generator flanges on the left-hand side, while the water pump and magneto may be located on the right-hand side, looking at the engine from the front end.

The flywheel is 17 in. in diameter and has a rim $3\frac{1}{2}$ in. wide. Different rim sections, however, are used, according to the purpose for which the engine is to be employed. For truck work a 76-lbs. flywheel is provided, while for tractor work a flywheel weighing 115 lbs. is fitted. The weight of the complete engine, with regular equipment, is about 800 lbs.



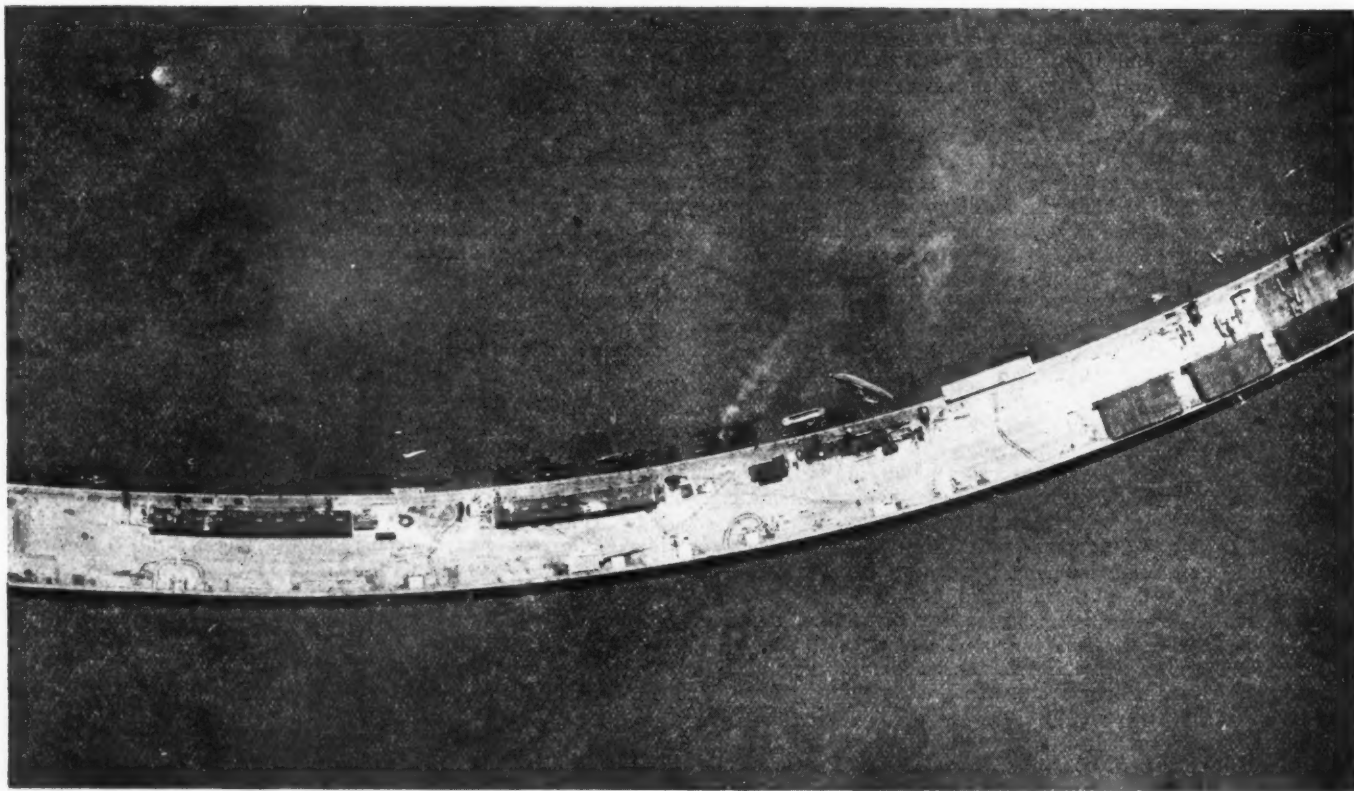
Fan, pump and magneto drive



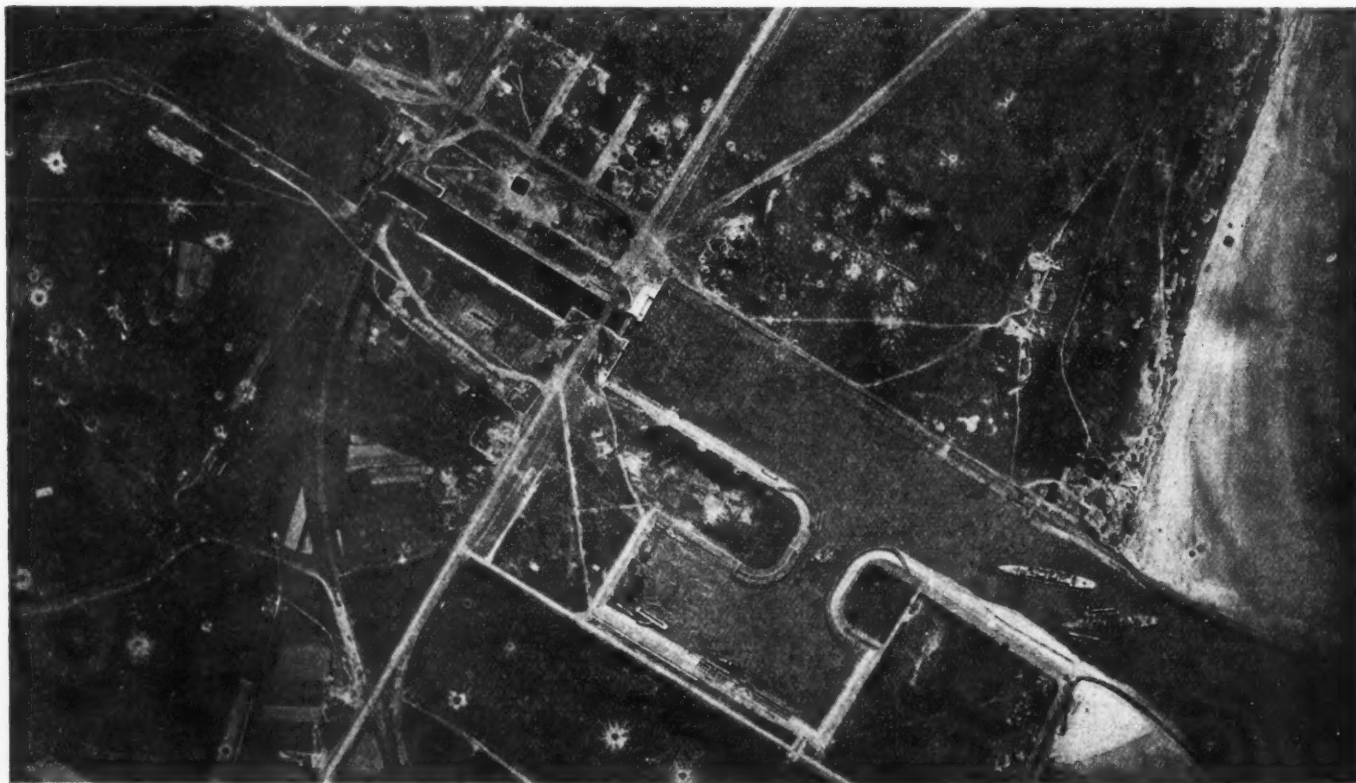
Diagrammatical illustrations showing method of operation of Buda lubricating system

High Altitude Airplane Photographs

Of Some Interesting War Happenings



Zeebrugge Mole on the Belgian coast. The photograph, taken by the pilot in a Handley-Page machine, shows the result of his work. Lying in the water may be seen a destroyer on its side, sunk by a bomb from the airplane. The photograph also shows a series of German destroyers in the water at the edge of the dock and four seaplane sheds with seaplanes in the air over the water



Zeebrugge Harbor. This picture, taken at low tide, shows clearly the two British ships sunk across the channel, blocking it so that German submarines could not get to sea. A German dredge may be noticed working alongside one of the sunken vessels. All four of these photographs were taken at altitudes of from 17,000 to 20,000 ft.



The city of Metz attacked by airplanes. Direct hits made on the Metz railroad stations and railroad line. In this photograph the clouds must not be confused with the smoke of the airplane bombs. The airplane bombs exploded directly on the railroads and near them, and are shown by the small light puffs of smoke, of which there are eight in number



The City of Cologne, while being bombed by a Handley-Page airplane. The smoke denotes the explosion of the bombs. The heaviest smoke marks the bomb which exploded as the photograph was snapped. Near the center of the photograph and toward the railroad line may be seen a bomb falling

Official Guide for Airplane Inventors

(Continued from page 271)

ducing the size of the orifice through which the liquid flows or by reducing the equivalent head of the orifice, which latter can be reduced by making the pressure in the float chamber dependent upon the pressure above the carburetor throttle or by adding more air to the carbureted mixture above the mixing chamber. These functions are carried out automatically in two types of carburetors so far developed. One of these, made by the Zenith Carburetor Co., Lyons, France, comprises a barometric capsule which through a linkage operates a valve regulating the pressure in the float chamber. The other was developed by the Panhard-Levassor Co., Paris, France, and has a diaphragm acted upon by atmospheric pressure and by the pressure within the carburetor. The motion of this diaphragm controls an auxiliary air valve above the primary mixing chamber of the carburetor.

The temperature of the air and the density decrease at high altitudes, but the decrease follows no regular law. A change in temperature affects the quality of the mixture, since the viscosity of the fuel changes with the temperature and the quantity flowing through a fixed size orifice varies accordingly. The variation, however, of the mixture quality as a result of temperature changes is small compared with variation due to barometric pressure changes, and complication of any thermostatic arrangement for correcting the rate of gasoline flow or of air admission might outweigh the practical advantages gained. The value of any such apparatus would depend entirely on the practicability of the form in which it appeared.

Precompression of air supply for the engine is one of the chief existing problems. Apparatus for this purpose must operate reliably and be light in weight. It must have a very high mechanical and volumetric efficiency.

There is considerable room for experimental investigations in ignition. Spark plugs offer a problem, due to the fact that modern engines develop explosion pressures of 400 to 600 pounds per square inch and m.e.p. of 120 to 135 pounds.

Insulation must be capable of withstanding great temperatures and the plug must not leak. Spark points of the plugs must be maintained at a high enough temperature to prevent carbon accumulation on them and yet their temperature must not be high enough to cause pre-ignition of the combustible charge. Consequently, spark points must be maintained within a definite temperature zone. Spark points in plugs now used have so low a temperature at low engine power that the points carbonize and short-circuit the plug. This carbonizing can be corrected by a better system of lubrication. Heating and expansion of the insulated electrode causes cracking of the insulator and the fact that all good electric insulators are poor heat conductors makes it difficult to keep the temperature of the insulator down. The chief difficulty in the present ignition systems is too high weight.

Engine parts are now considered reliable. Failures of parts of French aircraft engines 1915-16 were less than 2 per cent of the total number and 30 per cent of these were due to hits by projectiles.

Efficient self-starting systems, either of air, electric or powder shell types, are sought. The starters are usually applied to the engines on seaplanes, which do not operate at high speeds or high elevations, and are separate from the engines in all other planes. The weight is a serious factor. An air starter has in some instances been used, fitted to the engines in fighting planes which make use of an air bottle for supplying the necessary air under proper pressure. This air is either led through a distributor to the engine cylinders or operates a multiple cylinder air engine connected with the crankshaft by means of an overrunning clutch. It is suggested that a plan now used on gasoline railway cars, by which the engine is started by a charge of black powder detonated by a special mechanism in the cylinder head, may be further developed, although the problem is difficult in engines with a large number of cylinders.

Exhaust mufflers of light weight, effective in muffling and able to withstand excessive heat would be desirable. The

mufflers could not interfere with the cooling of the exhaust valves by radiation and conduction. Aircraft engines have 200 to 600 shaft horsepower, and since the heat constantly passing out of the exhaust gases is at a rate equal to twice the useful power, it makes muffler construction difficult. An aviation muffler would require at least ten times the power of an automobile muffler, which is called upon to radiate 10 per cent of the amount of heat which would pass through the aviation muffler.

Fuel storage and supply systems are not yet satisfactory. The arrangement of the fuel tanks and lines, and methods of fitting the tanks to the engines, are unsettled features of aircraft construction. Suggestions have been made to make the tanks and lines of steel to make them bullet proof. The weight is an objection, but this may be overcome by developing special alloys possessing little weight and great strength.

Gasoline having a boiling point not exceeding 250 degrees Fahrenheit is the only successful fuel used in airplane engines thus far. Hydrocarbon fuels of the higher boiling points crack or become dissociated under high temperature and pressure. A fuel which carried the oxygen required for its combustion would eliminate the effect of altitude and the temperature of the atmosphere upon the power of aviation engines.

There is room for improvement of the various instruments devised for aircraft, including the barographs indicating and recording the altitude, drift meters indicating the side slip of the plane, inclinometers indicating the angle of the plane, tachometers indicating the engine speed, oil, gasoline and water gages indicating the temperature and pressure of these fluids, and speed indicators which indicate the speed of the plane relative to the air through which it is traveling.

Two instruments which would be exceedingly valuable would be one giving the speed of the plane relative to the ground and one showing the altitude of the plane above the ground. Pilots flying at night with a barograph can only know their altitude above sea level, and when over strange country, if they fly at low elevations, they are not certain that they are at a safe altitude.

Dr. W. F. Durand, discussing aeronautical problems in the bulletin, points out the need for better materials for airplane construction, improved engines, pitch adjusting propellers, improved spark plugs, parachutes, stabilizing devices, self-starters and aeronautical instruments.

The development of wing curves of a high speed type which will have a small center of pressure movement through large angles of incidence and development of wing curves of greater lift-drift ratio are important. To engage in experiments of this nature it will be necessary to use wind tunnels which give wind speeds exceeding 100 m.p.h.

Airplanes can be improved, according to Mr. Stout, to allow greater visibility, greater gun range, quicker maneuvering and better stability. The range of flying speed can be increased to minimize landing danger. Fuel consumption can be minimized by further elimination of parasite resistance. Airplane construction should be investigated for possibilities of lightening the planes and to change them from their present kite-type construction to more stable design.

Wooden propellers are far from satisfactory, though as yet no substitute has been found. Propellers would be desirable which would permit motors to operate at the best speed (around 2000 r.p.m.) without requiring gearing down from motor to propeller.

The compass used in airplanes to-day is far from satisfactory. The gyroscope is not yet developed in light enough form. Possibly airplanes of the future will be steered along wireless rather than magnetic lines with definite control between cities.

Bullet-proof tanks are desirable. Otherwise the airplane engine—the Liberty engine—says Mr. Stout, is proceeding satisfactorily, its excellent development being due to standardization and to the fact that our program comprises but a single type.

An Improved Elastic Limit Recorder

Consisting of an Attachment to a Standard Testing Machine by Means of Which One Person Can Accurately Determine the Elastic Limit of Specimens Both in Tension and Compression

THE method usually employed heretofore in making elastic limit determinations required three persons, one for reading the elongation with an extensometer, another for operating the testing machine and the third to note down the data. The method is, therefore, hardly suited for commercial work where quick results are wanted.

An improved instrument, due to the late J. M. Summer, has been in use in the physical testing laboratory of the Westinghouse Electric & Mfg. Co. at East Pittsburgh for some years, and was described in a paper read at the recent annual meeting of the American Society for Testing Materials.

This recorder may easily be applied to the standard testing machine, and by its use a single person can accurately determine the elastic limit of any sample that is being tested in tension or compression.

The apparatus consists of a semi-automatic load-indicating mechanism which is attached to the testing machine by means of a frame. The recorder can be moved to the right or left and fastened securely in any desired position by means of a set screw. The vertical rows of holes in the standards at each end allow the recorder to be raised or lowered at will.

Attached to the weighing poise is a card graduated to conform to the graduations of the beam, the range being from zero to 12,000 lb., with a minimum reading of 100 lb. This allows a standard 4 by 6-in. filing card to be used, and the results are sufficiently accurate for commercial work. As the limit of accuracy of weighing on a testing machine of 100,000-lb. capacity is about 50 lb., it might be desirable to have the minimum reading of the card 50 instead of 100 lb. This can be easily accomplished by increasing the length of the card to 12 in. and reducing the weight of the poise one-half, thus doubling its rate of travel.

On the back of the card spaces are ruled in which may be recorded the serial number of the sample tested, ultimate (beam) load, elongation in 2 in., and the reduced diameter. After the elastic limit is determined the card is filed so as to be available in case a complete curve is subsequently desired.

The recorder is shown in detail in the cut. It is essentially a solenoid with a loosely fitting armature, A. When at rest the armature is at the bottom, as shown, but when current is flowing through the coil the center of the armature will be at the center of the coil. The adjustable screw, S, is set so that it will just touch the armature when it is in this position.

If the armature is at rest at the bottom of the tube and the circuit is closed it will be pulled up and its inertia will carry it past the center of the coil, so that it will hit the screw E a hammer blow. It will then drop to the center of the coil, where it will be held until the circuit is broken, when it will drop to the bottom of the tube.

The bell crank, D, is pivoted at P, so that when the armature hits S the motion is transmitted to the prick punch B, which is driven sharply against the card in the holder, H, making a small pin hole in the card and immediately returning to its normal position, allowing the card to continue its movement. A light spring on the crank assists it in returning to its normal position.

In the bottom of the tube is a short spring which acts as a shock absorber for the armature. A clamp, E, on the side of the recorder serves to mount it on the frame.

The frame consists of two upright pieces fastened to the machine, with a crosspiece on which the recorder is mounted by means of clamp E. The recorder can be slid along this crosspiece in order to set it so that it starts at the zero point; and also in order to reset it, which is necessary when

the load at the elastic limit exceeds 12,000 lb., as the record must then be run across the card a second time.

The uprights have holes drilled about $\frac{1}{2}$ in. apart so that the height can be adjusted and the position of the recorder changed. In this way several tests can be put on one card.

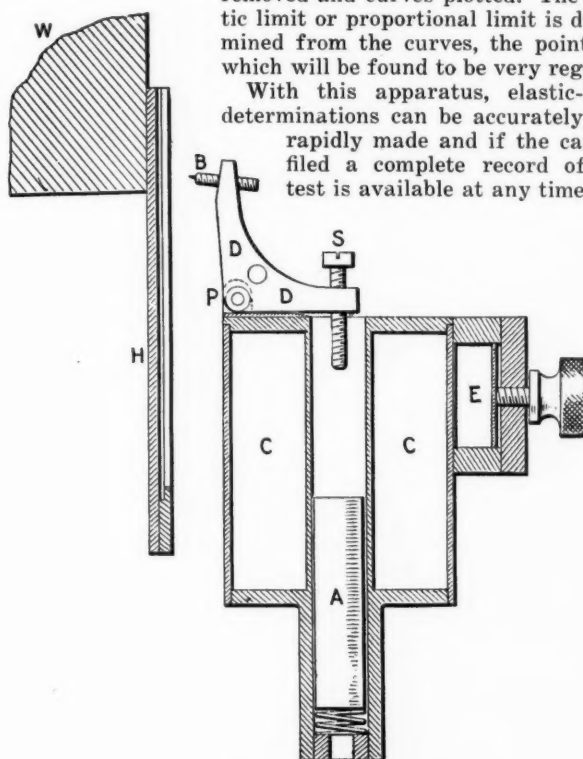
A push button for operating the recorder is located where the operator can conveniently reach it while he is watching the extensometer.

The card holder is made of aluminum and is fastened securely to the poise. A hole is drilled in the poise to remove a weight equal to that of the holder.

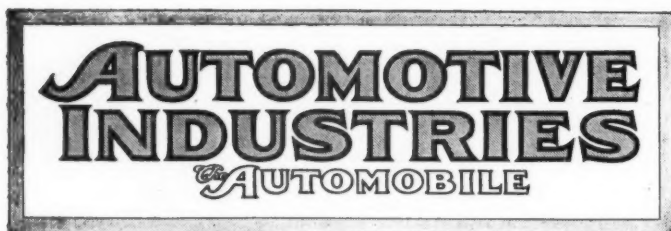
When using the recorder, the test specimen is placed in the machine in the usual way, with the extensometer in position. The card is then placed in the holder and fastened so that it cannot shift. The poise is then set so that the beam reads zero load and the recorder is slid along the cross bar until when the button is pressed the punch mark is on the zero line on the card. The recorder is clamped in this position, the machine started, and the operator stations himself at the extensometer. When the extensometer shows predetermined elongations, such as 0.0002, 0.0006 in., etc., he presses the button. As the card attached to the poise is moving in front of the recorder, which is stationary, and as the card is graduated to correspond to the beam, the punch marks will indicate the load at which the elongation is measured.

The operation is continued until the elastic limit is reached, after which the extensometer is removed and the yield point determined. The test is completed in the usual manner, the record being made on the back of the card.

For the next test, the recorder can be moved down to the next position, and in this way five or six tests may be grouped on the same card. After the tests are completed the card is removed and curves plotted. The elastic limit or proportional limit is determined from the curves, the points of which will be found to be very regular. With this apparatus, elastic-limit determinations can be accurately and rapidly made and if the card is filed a complete record of the test is available at any time.



Summer elastic limit recorder



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Standardizing Tractor Parts

THE fact that the majority of new tractors seen at the Salina demonstrations used standardized types of robust automobile or motor truck engines made especially stout to meet tractor requirements is proof that a new maker generally buys the best goods that are on the market. These same makers were not able to purchase standardized front axles, frames or other parts, and hence were forced to design and manufacture something of their own. Stronger arguments for arriving at some fairly definite conception of tractor parts could not be asked for. Herein lies a profitable field for the parts maker, and the first man in the field with a real job will have a good start on other competitors. There is room for nearly as much similarity in front axle tractor design as in front axle truck design. The same can be said of tractor steering gears. The lack of some definite form of tractor frame has led to a few serious engineering errors in

some new tractors. To-day the trend of tractor design is sufficiently well defined so that the parts maker can design a job that will meet the requirements of a great many firms.

Handicaps of the Aircraft Inventor

OF late numerous inventors have been turning their attention to aircraft, because inventive effort in this field has been encouraged by our Government. Unfortunately it is a very difficult thing for the individual inventor, not connected with the aircraft technical service, to do effective work, for the reason that he cannot be familiar with the latest practice in military aeronautics. Aircraft development has progressed to a considerable extent along certain lines, and for the purpose of the present war there is practically no chance that any radical innovations such as engines functioning on other than the ordinary cycles or plane constructions sustained by other means than the lift on wings inclined to the direction of propeller thrust will be of any practical use, as it would take too long a time to reduce such innovations to a production stage.

Aircraft development will take place along the lines of detail improvement. Improved designs will be gotten out in which the material will be disposed to give greater strength in the directions where strength is needed and in which the parasite resistances will be reduced. But the untrained inventor can do little along these lines, because it takes experience and training to judge the distribution of strains in a complicate structure like an airplane.

In the simpler elements of the airplane, such as turnbuckles, cable loops, etc., standardization has been carried through to a considerable extent, to facilitate production and replacement of parts, and change in design is not greatly desired, though if sufficient advantage can be shown the standards will, of course, be modified.

Much inventive ingenuity is also being spent on devices intended to preserve the life of aviators, these taking the form of gyroscopes or other automatic stabilizers, or of parachutes. While the motive behind these efforts is most praiseworthy, the fact is that anything which materially reduces the speed and climb cannot be tolerated on a fighting machine, as it might be a danger rather than a safeguard.

It will thus be seen that the path of the inventor who wants to perfect military aircraft is strewn with difficulties. There will undoubtedly be much waste of effort in a fruitless search for radical improvements in design. Much as one would like to avert such waste, it would not be good policy to discourage inventive effort in this direction because it has been the general experience that occasionally sound practical ideas pertaining to an industry came from persons entirely outside of it, and one improvement thus achieved might more than pay for the effort wasted on hundreds of impractical ideas. The problem is to guide invention into the proper channels.

A Suggestion for Our National Shows

By David Beecroft

WHY should not the national automobile shows this year take the form of national automotive exhibitions of what the automotive industries have done as direct war work in the development, manufacture and production of automotive apparatus?

Let the Grand Central Palace and the Chicago Coliseum be converted into exhibits of this war machinery.

Let the exhibits contain as much airplane apparatus as it is possible to display. There are many types of aviation engines; there is a great volume of equipment for airplanes; there are our training planes; there are our fighting planes that have already been seen by hundreds but which should be seen by hundreds of thousands; there are many parts entering into the airplanes that could be separately shown.

But aviation is but one small aspect of such an automotive exhibition. The volume of new types of artillery tractors developed by the ordnance department should all be exhibited. These have been publicly shown in a few places, but they, too, should be shown to the hundreds of thousands that might attend a national show.

Besides aircraft and ordnance there is the motor truck in all of its many forms. The government has labeled it a 100 per cent essential in war. It should be shown in all its phases of usefulness.

The farm tractor, which has become the veritable industrial tank for our armies of agriculturists, should be shown. Our city populations are strangers to it. Nine-tenths of the country has not a speaking acquaintance with it. It is a part of the automotive field, a new member of the circle of automotive industries, and as a war machine stands side by side with the airplane, with the artillery tractor, with the motor truck, with the motorcycle and with the automobile.

With such an array of war-time exhibits a great educational propaganda could be started. Our people must be more familiar with our automotive war apparatus. The more people who would see our airplanes the more sane would be the attitude of the public on airplane questions. Educate our people on airplanes for training and fighting uses, and they are better judges of airplane rumors. Such an education would be one of the best possible guarantees against so many of the malicious rumors that have infested the nation in the last 10 months.

Make such a great war automotive exposition popular to the last degree by giving all receipts above expenses to war organizations. Give the receipts for one day to the Red Cross. For other days divide them among the Y. M. C. A., the Salvation Army, the K. of C. and other war activities that are worthy of support.

Would such an exposition not be one of the greatest demonstrations to the nation of what these industries are doing for the war?

Would not such a demonstration convince hundreds of thousands directly, and perhaps millions indirectly, of the value of the great automobile industry, so often wrongfully designated a pleasure car industry, to this nation and all our Allies?

If such a great demonstration of war apparatus were not possible then the New York and Chicago shows could be staged to represent two at least of the automotive industries that are in the 100 per cent essential column, namely, trucks and tractors.

Again the West has been in the van, and for several years has been staging automotive apparatus together in a single show. The automobile has not for years held the stage in the great distributing centers such as Twin Cities, Kansas City, St. Louis, etc. In these cities trucks, which were relegated out of the New York and Chicago shows, have always been in these Western shows. Boston has seen very clearly the eventual in the truck field and has always insisted on the truck show, and has each year held a successful one. New York and Chicago have been the only centers where the truck was legislated out of the show.

This year unquestionably the truck and the tractor will hold their well-established places in the Western show circuits, and it is fitting that these two greatest national necessities should be introduced face to face with the citizens who would attend the two great population centers of the nation.

□ Latest News of the

Manufacturers Look for Only 75% Cut

But Are Ready to Accept 100
Per Cent Curtailment
if Necessary

DETROIT, Aug. 13—The shock caused by the War Industries Board when it announced the possibility of curtailing passenger car production 100 per cent has passed away and the situation is viewed with clearer vision by the manufacturers, though it is still regarded as most serious.

The decision is not looked upon as an order by the manufacturers, and they are waiting to see what the outcome will be. The War Industries Board's reply to the letter sent by the National Automobile Chamber of Commerce simply brought to a head an issue which has been pending for some time.

If it is necessary for the Government to utilize their plants to 100 per cent capacity, the manufacturers are ready to hand them over regardless of the hardships it may cause the passenger car business and its distributing organization.

Pending a decisive step to be taken by the War Industries Board and the issuance of an official order manufacturers will continue producing cars as their ability permits. Of course it is too early to even hazard a guess, but manufacturers think they will be allowed to remain in production, however small the extent may be, and do not believe the cut will be so drastic as the decision seems to indicate.

Until the questionnaires which have been sent out by the War Industries Board have been returned and an analysis of the situation has been made, manufacturers do not expect to know definitely whether or not a 100 per cent curtailment will follow. It is their firm belief that plants will be engaged in war work to a greater extent, but production may not reach 25 per cent of normal.

The data and information which the War Industries Board requested on July 16 have not been completed by the majority of manufacturers and, according to their understanding, are not due until Aug. 15. Owing to this fact very few manufacturers were able to state at this time just how much inventory they have on hand.

The Hupp Motor Car Corp. stated it had enough big parts in stock to last at least 12 months, but of the smaller ones some had less than a month's supply. The same conditions prevail with most of the larger manufacturers. In-

ventories were never so unbalanced. The Liberty Motor Car Co., however, reports a well-balanced stock, and is in a position to maintain production for 4 or 5 months without buying more.

The Ford Motor Co. is very reticent concerning the situation. It states that no plans have been made and that it will continue production until the Government tells the company to do otherwise. It will be remembered that 75 per cent of the capacity of this company is engaged on war work. The daily commercial production is now 750, of which 350 are passenger cars.

The biggest portion of Dodge Bros. plant is engaged on war work, and further orders are constantly being added. The officials declined to make any comment on the proposition, and it is difficult to state what their attitude is.

According to Hugh Chalmers, vice-president of the National Automobile Chamber of Commerce and representative of that organization in Washington, who has just returned to Detroit, there is no desire on the part of the War Industries Board to put the automobile industry out of business, yet it is the War Industries Board's contention that having the industry go on a 100 per cent war manufacturing basis would be an ideal condition.

Assurances were given Mr. Chalmers that if steel is available after war industries needs have been satisfied, the motor car manufacturers will get their share.

The common error in thinking that the automobile industry uses only 5 per cent of all the steel produced in this country should be corrected. It is not this steel that plays such an important part in the manufacture of cars. It is the special steel—chrome nickel, vanadium, etc.—that is the bone of contention.

Mr. Chalmers addressed the following letter to the members of the National Automobile Chamber of Commerce:

"Supplementing what Alfred Reeves has written to you with reference to the letter from the War Industries Board, it is only fair to say that we did not know that any publicity would be given to this letter, because we were assured by the members of the board it was not their intention to give any to this subject. They denied having given out any of the objectionable publicity in the past and agreed with us that we should have as little as possible.

"The attitude of the War Industries Board was this:

"It was very much pleased at the spirit shown by our members in voting for the 50 per cent curtailment of passenger cars, but it felt it could not accept that agreement without obligating itself, indirectly at least, to give us materials on a 50

(Continued on page 302)

Production Reduced in Detroit District

Some Manufacturers Are Close
to the 25 Per Cent Line,
Others Still Lower

DETROIT, Aug. 9—The most marked change in this territory in the passenger car manufacturing field is the gradual reduction of production. Many manufacturers are nearing the 25 per cent line of production; some have already arrived at this figure. Whether this output will be reduced still further is a matter of conjecture. Manufacturers are reticent about making any prophecies regarding the future. They will continue production up to the limit of their ability to secure materials, many feeling optimistic about the situation, and believe relief of the strain under which they are laboring is close at hand.

Production of the Willys-Overland, Inc., averages 400 daily; that of the Paige is 35; Reo has reduced its production 50 per cent compared with a month ago. It is now 40 cars per day, while the output of the speed wagon is 25 daily. Buick's production is in the neighborhood of 175 daily; Chalmers, 50; Harnoun is reported at 10; King averages also 10; Liberty produces 7, and Scripps-Booth, 40. Ford passenger cars come out at the rate of 350 a day and the trucks at 400. Packard, Hupp, Briscoe and Columbia production figures are the same as reported a month ago.

Production of the Cadillac goes entirely to the Government. This was curtailed Aug. 1 from 40 cars daily to 25. This latter figure represents what was going to the Government. With the curtailment of production it is apparent that no cars are going into the commercial field from this plant.

Navy Contractors Asked to Ship Early

WASHINGTON, Aug. 13—The Bureau of Supplies and Accounts of the Navy Department requests all navy contractors and others engaged directly or indirectly in the purchase, shipment and storage of navy material and supplies to endeavor to move all materials and supplies possible prior to the winter season so as to prevent freight congestion during the colder months. The statement adds that while the railroads are now handling considerably more traffic than usual and will increase freight equipment and terminal facilities, it is possible that we will experience unusual severe weather again this coming winter, which would tend to hamper freight shipments.

Automotive Industries



Trucks Are Classified Among Utilities

Priority Board Recognizes Industry as Essential—Manufacturers to Make Monthly Reports Giving Details of Commercial Vehicles Made and Sold

WASHINGTON, Aug. 9—Motor trucks used directly or indirectly for war purposes are war essentials and their production for such purposes will be facilitated. Motor trucks employed in essential uses in civilian industry constitute an important transportation medium, and curtailment for such uses should be avoided as far as possible. Manufacturers of motor trucks whose factories are exclusively devoted to producing products absorbed directly or indirectly by the Government or in other uses of essential importance will be given class B-4 rating for steel requirements, conditioned, however, that the manufacturer will observe a pledge of co-operation and the regulations of the Priority Board. These statements form the salients of a circular now being prepared by the War Industries Board for distribution to manufacturers of motor trucks, which outlines the assistance they will receive from the Priority Division in the manufacture of trucks.

Will Define Essential Uses

The circular will specifically define essential and non-essential uses of trucks. It states that the demand for iron and steel is such that no guaranty can be made to the motor truck or any other industry that its steel requirements or any operation thereof will be met. However, the members of the motor truck industry, states the circular, who comply in good faith with the pledge of co-operation will be accredited the class B-4 rating in procuring their supplies of fuel, iron and steel. The B-4 rating insures the issuance of priority certificates, and places the motor truck well up in front in the list of very important steel consumers.

The Priority Division will receive application of any manufacturer of motor trucks for a place on the preference list for fuel, in each instance taking into consideration the fuel situation of the manufacturer, the amount of his direct and indirect Government business, and the uses to which the remainder of his produce is being devoted.

Any motor truck manufacturer whose factory is now or in the future will be exclusively devoted to making products absorbed either directly or indirectly by the Government or otherwise of essential importance, and whose fuel requirements and output bear economical rela-

tion to each other, will be placed upon the preference list for fuel, providing he observes the pledge of co-operation and regulations.

Any manufacturer of trucks who believes that he is entitled to an even higher rating than B-4 for securing steel requirements to complete any part of a contract or order, may make a formal application for the higher rating to the Priorities Division.

The manufacturer's pledge applies also to the uses of steel already in his possession, and to manufactured or partly manufactured trucks in his possession at the time the pledge is made.

Pledge of Co-operation

The pledge of co-operation to be given by any motor truck maker who desires to be placed on the preference list for fuel, and in class B-4 for steel, is as follows:

"The undersigned hereby pledges itself (1) to use only in the manufacture of motor trucks or repair parts for motor trucks the steel suitable therefor which is now in its possession or which may hereafter come into its possession; (2) to sell no motor trucks of its manufacture except (a) for essential uses as that term has been or may be defined or applied by the Priorities Division of the War Industries Board, or (b) under permits in writing, signed by or under authority of such Priorities Division; (3) to sell no user an unnecessary number of motor trucks even for essential uses; (4) to discourage the purchase of any motor truck to replace a usable truck already in service and to give maximum encouragement to the repair of trucks; (5) that this pledge shall bind not only the undersigned but also its branch houses; subsidiaries, dealers, brokers, factors, commission merchants and all other selling agencies; (6) to make no delivery of any motor truck to any one for resale, either directly or indirectly, until such one has filed with the undersigned its pledge of co-operation in writing; and to make monthly reports as required by the War Industries Board to the Automotive Products Section of said Board or otherwise as said Board may direct."

The manufacturer must also require from anyone to whom he delivers a motor truck for resale a subsidiary pledge in much the same terms.

Each manufacturer must forward dur-

ing the first fifteen days of each month a sworn report to the Automotive Products Section of the War Industries Board showing the number of motor trucks manufactured in the preceding month, the number delivered to the United States Government and its allies, the number on hand, the approximate stock of steel on hand and such other information as may be required. These reports will be held confidential by the Board unless the public interest shall require otherwise.

The creation of new plants or the expansion of existing plants for the manufacture of motor trucks is held to be unnecessary and undesirable inasmuch as existing facilities are ample to produce all the trucks required for essential use or for which steel can be furnished.

The original plan of creating a list of essential truck users as was announced earlier in AUTOMOTIVE INDUSTRIES has been given up for the time being. The Priorities Division has preferred to believe in the good faith of the manufacturers and distributors of motor trucks and is leaving the determination of an essential consumer to them.

Makers' Monthly Reports to Guide Board

The monthly report of the manufacturers to the Automotive Section of the War Industries Board will be used by the Priorities Division to check the essentialness of the sales of trucks. If it should develop that any violation of the rules and sales are made to non-essential users, the Priorities Division will be obliged to limit the sale of trucks by means of a certified list of purchasers.

The Class B-4 rating comprises orders and work which, while not primarily designed for the prosecution of the war, are, however, of public interest and essential to the national welfare or otherwise of exceptional importance according to the definition of Class B by the Priorities Board.

Applications for priorities certificates are to be made as heretofore by each individual firm to the Priorities Division of the War Industries Board, Washington. The board will furnish the necessary blank forms for this purpose.

June Exports High for Detroit District

DETROIT, Aug. 13—The exports from the District of Michigan for June have attained a high record. Among other things the following classes were listed: Automobiles and parts, \$1,500,142; raw cotton, \$1,269,731; iron and steel and manufactures thereof, \$1,678,804. The exports to France were almost all covered by automobile tires, adding machines and sawed lumber.

New York's Export Figures Improve

Over Half of All Automotive Exports of U. S. Pass Through Metropolis

NEW YORK, Aug. 9—New York's position as the principal port of export continues to improve, although the figures for June are still slightly below those of January and February. During June the total value of cars, trucks and parts shipped to foreign countries from New York represented 54 per cent of the total automotive exports exported from the United States. In May the New York percentage was 43 and in April the proportion was but 24 per cent.

Automobiles, trucks and parts exported through New York in June totalled \$3,633,577, as against \$3,339,588 in May and \$2,396,448 in April. Passenger cars were valued at \$1,495,346; trucks at \$1,370,955, and parts at \$767,276. The May values were respectively \$1,289,109, \$1,280,606 and \$769,843.

An interesting feature of the June exports is the good showing made by Latin

American countries, Argentina, Brazil, Chile and Uruguay in particular. As a matter of fact Chile was our best car customer for the month.

A Special Flag for Private Factories

WASHINGTON, Aug. 12—Every private factory in the United States, devoting more than 50 per cent of its total output to ordnance material, is to have the privilege of flying a specially designed flag. Orders to this effect have been issued by Major General C. C. Williams, U. S. A., and managers of the various ordnance production districts have been requested to inform the Ordnance Department at Washington of the number of plants affected.

The flag measures 4 ft. by 6 ft. Around the 4 sides is a red border. Within this border are 3 broad panels, the center one blue and outer ones white. In the middle of the center panel of blue there is a design in white of the Bursting Bomb, insignia of the Ordnance service.

Pierce-Arrow Makes Big Profit

BUFFALO, Aug. 8—The Pierce-Arrow Motor Car Co. reports operating profits of \$1,523,421 and net profits of \$914,029 for the three months ending June 30.

American Haviland Undergoing Trial

Division of Aeronautics Inaugurates Severe Flight Tests for Plane and Engine

WASHINGTON, Aug. 9—On a flight to test the American de Haviland-4 equipped with a Liberty 12 engine, two officers of the Air Service left Washington this afternoon at 4.20 for Philadelphia. This test is being made by the Division of Military Aeronautics and the two officers making the flight are Major W. C. Oker and Second Lieut. L. Deutsch. These two officers started originally from Dayton, Ohio. They had made 2 flights from Dayton to Mt. Clemens, Michigan, and return, and one to Camp Perry and return, when on Saturday at 1.14 p. m. they left the Dayton Field and headed direct for Washington, D. C.

At 3.45 p. m. they were 20 miles north of Harrisonburg, Virginia, where they landed for gas, but decided to stay over night. Leaving this location early the next morning they landed on the Polo Field at Potomac Park, Washington, an hour later, making the total flying time from Dayton to Washington in 3½ hr.

Leaving Washington that same afternoon, they made Philadelphia in 58 minutes. Returning to Washington Monday afternoon, they left again for Philadelphia this afternoon. From there they start for Mineola, and will eventually start back for Dayton from the Long Island Field.

Besides testing plane and engine the two officers are testing compasses. The plane carries a spare propeller strapped underneath the fuselage and an extra landing wheel inside. The plane has covered over 2000 miles in the last 2 weeks with no engine trouble and it will be driven until it shows engine or body weakness. The idea is to give the plane and engine as hard a test as possible.

In addition to the extra parts they carry, the officers also have their personal luggage, one idea being to keep the total weight supported up to approximately that of battle flying.

From Dayton to Washington the officers flew entirely by compass, passing over Alleghany and Blue Ridge Mountains at an elevation of about 19,000 ft., and in crossing West Virginia they were above such thick clouds that they did not see that State at all.

Export Licenses for Sweden Will Be Considered

WASHINGTON, Aug. 10—Applications for exportation of all commodities to Sweden will now be considered by the War Trade Board.

Exporters in the United States before filing applications for export licenses must obtain from the prospective importer in Sweden advice that there has been issued by an appropriate importing

AUTOMOBILE, TRUCK AND PARTS EXPORTS FROM NEW YORK FOR JUNE

	Cars		Trucks		Parts
	No.	Value	No.	Value	Value
Aden .....	..	....	..	....	\$186
Argentina	229	\$272,451	29	\$20,283	132,118
Australia	104	94,638	7	11,675	27,673
Barbadoes .....	..	....	..	....	1,458
Bolivia .....	..	....	..	....	99
Brazil	82	54,707	7	15,865	11,242
British East Africa.....	4	3,433	..	....	508
British East Indies.....	..	....	..	....	13,288
British Guiana.....	4	2,780	..	....	6,430
British Honduras.....	..	....	..	....	86
British India.....	14	3,450	10	19,925	32,197
British Oceania.....	1	1,109	..	....	....
British South Africa.....	224	183,654	5	4,489	55,866
British West Africa.....	12	9,053	13	7,525	880
British West Indies.....	..	....	..	....	657
Chile	287	349,610	8	12,967	48,041
Columbia	1	1,760	1	600	2,447
Costa Rica.....	1	500	..	....	44
Cuba	22	45,016	18	67,264	50,130
Dutch West Indies.....	..	....	..	....	206
Ecuador	12	19,118	..	....	557
England .....	..	....	38	78,761	173,486
France	185	98,331	261	945,726	119,542
French Africa.....	..	....	..	....	20
French West Indies.....	4	3,879	9	12,870	2,768
Guatemala	1	1,196	..	....	238
Haiti	9	7,642	1	1,807	4,257
Honduras .....	..	....	..	....	116
Iceland	13	10,124	1	2,245	1,586
Italy	1	2,500	..	....	6,536
Jamaica	6	3,820	4	4,250	6,054
Mexico	19	22,339	4	11,396	8,323
Newfoundland	1	4,550	..	....	65
New Zealand.....	40	32,281	..	....	70
Nicaragua	7	5,843	..	....	42
Norway	5	18,444	25	108,000	....
Panama	3	2,419	..	....	3,494
Para .....	..	....	..	....	488
Peru	97	114,389	13	35,287	12,122
Salvador	8	11,592	..	....	371
San Domingo.....	22	13,227	..	....	2,273
Spain	3	9,789	..	....	2,704
Straits Settlements.....	..	....	..	....	116
Trinidad	10	3,646	2	11,020	5,924
Uruguay	148	72,107	9	9,000	29,418
Venezuela	6	6,179	..	....	3,210

association, or by the Statens Handels Kommission, a certificate covering the proposed consignment. The number of the certificate should be forwarded by the importer in Sweden to the American exporter. This number should be specified on Supplemental Information Sheet X-104, which must be duly executed and annexed to the application for an export license.

Applications for licenses to export to Sweden commodities for which a Handels Kommission certificate or an importing association certificate is required will be considered only in the event that the said certificate has been issued subsequent to June 14, 1918. Certificates issued prior to that date will be treated as void.

Ford Plans Mexican Tractor Factory

WASHINGTON, Aug. 9—Henry Ford has submitted a plan to President Carranza of Mexico for the establishment of a plant in that country to manufacture Fordson tractors on an extensive scale. The idea is to instruct Mexican mechanics in Ford factories in this country in the first instance and then send them back to Mexico to operate the new factory.

Tractors will be sold to farmers at practically cost price on terms which will permit of their being paid for out of the increased crops made possible by their use. Mr. Ford states that his sole object is to benefit Mexico, and that any profit which may be made will remain in that country.

It is the intention to invest a considerable sum in the enterprise, several millions if necessary. No factory location has been chosen as yet, but investigation as to local conditions of transport, coal, etc., is being made. The fulfillment of this scheme will naturally reduce the cost to the consumer, who will save freight, duties, import charges, etc.

Goodyear June Sales Are \$13,562,915

AKRON, Aug. 12—The gross sales of the Goodyear Tire & Rubber Co. in June amounted to \$13,562,915. Although this total is somewhat lower than for the two preceding months, it makes the total gross for the eight months up to the end of June, \$88,390,432. The remaining four months, normally among the heaviest, should produce an additional \$50,000,000 at least, making the year's business reach \$140,000,000. In the 1916-1917 year, Goodyear transacted \$111,450,000 worth of business.

Practically every product of the company is used extensively by the Government for war purposes. The increase in sales of motor truck tires alone will more than offset any decrease in the demand for tires due to the curtailment of production of passenger automobiles. Demand in all lines of manufacture exceeds production, which is limited only by the number of employees obtainable.

Dort Increase Stock to \$2,000,000

FLINT, MICH., Aug. 12—The Dort Motor Car Co. has increased its capital stock from \$1,500,000 to \$2,000,000.

Bomb German Cities Intensively

Successive Groups of 25 Planes to Be Dispatched at Frequent Intervals

WASHINGTON, Aug. 10—The feasibility and demoralizing effects of long range bombing were emphasized here by British fliers recently arrived from the front. They state the only way that Germany can be made to realize she is getting the worst of the war is by carrying the war right into Germany, and the quickest way we can do that is by air. Six of the principal manufacturing towns on the western frontier of Germany lie within easy bombing reach of the French and British lines. Raids already undertaken over German soil by the British squadrons operating from the Nancy area have had far-reaching results.

Gas, tanks and airplanes, it was pointed out, are the new features of this war. Gas and tanks can both be comparatively readily overcome by the use of gas masks and anti-tank guns. Aircraft, however, can only be fought to any effective degree by enemy aircraft. In consequence the possibilities, once the Allied air forces greatly exceed those of the Boche, are unlimited.

The following example was pointed out by a British aviator to show what can be accomplished, using a minimum quantity of men, machines and money:

"Given 500 machines each capable of carrying 1 ton of bombs and having a service radius of 200 miles—that is machines capable of dropping 1 ton of bombs on a given town within a radius of 200 miles from their base and returning.

"Select 1 single town within a 200-mile radius which if destroyed will vitally affect production of shells or other munitions.

"Divide the 500 machines into 25 groups of 20 machines each. To obtain the best moral and physical results, the raid must be continuous. Start the groups with intervals of 1 hour between them.

"Deduct as much as 30 per cent for engine failure, machines brought down by the enemy, and machines failing to find or reach the target (this is an exorbitant percentage to deduct. Under active service conditions 10 per cent to 15 per cent prove to be nearer the mark.) The result will be the dropping of 14 tons of bombs on the town selected, each hour, for 25 consecutive hours, that is a total of 340 tons of bombs. The effect on the doomed town can scarcely be imagined. It would be reduced to a complete state of ruin and chaos."

Another important factor, it was stated, to be taken into consideration in air raids is fire. The anti-fire equipment of the larger German towns is capable at the utmost of dealing with from 12 to 15 fires simultaneously, and by calling upon neighboring towns for assistance with about 5 more. This makes a total of 20. A continuous air raid for 25 hours would establish hundreds of fires, the vast majority of which would be left to burn out untouched.

It was said that if the air forces of the Allies were only sufficiently greater than the Germans to allow one attack each week upon a German town as outlined here, the end of the war would be in sight very soon.

Wire Wheel Corp. Gains Decision

NEW YORK, Aug. 8—The Wire Wheel Corp. of America has received a decision in the matter of its proceedings to restrain C. T. Silver of New York as agent of the Silver Apperson car from selling or otherwise disposing of a number of Fryer wire wheels purchased by the Apperson company from the Phelps Mfg. Co. It was held by Judge Hand of the U. S. District Court that there seemed to be but small doubt but what the Freyer wheel infringed upon the triple spoke patent, but that inasmuch as Mr. Silver had but a few cars fitted with these wheels on hand and no irreparable injury was likely to be suffered by the Wire Wheel Corp. he would deny a motion for a preliminary injunction if the defendant filed a bond in the sum of \$2,000 to cover such damage as might be shown to have been sustained by such infringement at the final hearing of the case.

British Austin Company now Employs 20,000

LONDON, Aug. 6—The Austin Motor Company has grown to be the largest British motor car manufacturing concern, rivalling Fiat for first place in Europe. It is said that the Austin Company now employs approximately 20,000 men as compared with 2500 before the war. At the annual general meeting of the company Sir Herbert Austin reported that during the past twelve months alone there has been an increase of 125 per cent in employees, and an increase of 65 per cent in assets.

Sir Herbert also stated that the post-war plans of the Austin Company are now entirely made. It is believed, as will undoubtedly be the case with other similar companies which have expanded beyond their normal growth, that in addition to their automobile and motor truck work, they will include certain definite branches of general engineering.

War Profits of British Motor Car Makers

LONDON, Aug. 10—According to information which has just been disclosed, seventeen of the leading companies in the motor and cycle group earned a total profit of \$5,725,540 in the twelve months ending June 30, as compared with \$5,278,590 for the previous year.

According to the same source of information the year's profits were distributed as follows: 38 per cent went to the common share holders, 16 per cent to the holders of preferred shares and 46 per cent to reserve.

Auto Indicator Increases Capital

GRAND RAPIDS, MICH., Aug. 10—The Auto Indicator Co. has increased its capitalization from \$15,000 to \$50,000.

Against Increase in Freight Rates

N. A. C. C. Traffic Manager
Argues Before I. C. C. on Proposed Schedule Changes

NEW YORK, Aug. 9.—In behalf of automobile manufacturers, J. S. Marvin of the National Automobile Chamber of Commerce appeared yesterday before the Interstate Commerce Commission to argue against the proposed increases in freight rates applied to automobiles as promulgated by the Railroads Freight Classification Committee. The proceedings were a part of the investigation which the commission is making into the so-called consolidated classification case.

Standardization of Carload Weights

For some time now the railroads have been working on the consolidated classification combining the Eastern, Western and Southern classifications into one for all territories with three different ratings, one for the East, another for the West and the third for the South. The chief object of this move is to standardize the descriptions of articles and the minimum carload weights. But it is also proposed to increase the rating on automobiles in the West 10 per cent or to make it 110 per cent of the first class freight rate.

Following a protest from the automobile manufacturers, it was proposed to draft a reclassification whereby freight vehicles or motor trucks will be separated from passenger cars in the West and given a reduced rating as second class under an advanced minimum carload weight of 12,000 lb. This proposed classification would not, however, satisfactorily provide for mixed carloads of freight and passenger cars and it is therefore likely that some further change will be suggested.

What the Increase Would Mean

In his argument, Mr. Marvin showed that some of the principal manufacturers have figured that the proposed 10 per cent increase in the classification of passenger cars would amount to from \$50,000 to \$160,000 on their individual shipments based on a volume of business equal to that of 1917, and that the total additional cost on all automobile shipments into the West on the same basis would reach perhaps a million and a half dollars. This would be in addition to the 25 per cent general increase in freight rates which went into effect June 25 and he stated that the railroads as a whole would gain not less than ten million dollars by this 25 per cent increase on a normal year's production. It was brought out that the shipping of automobiles had grown from a small volume when the present classification was fixed to 300,000 carloads per year and that the average value of automobiles on the contrary had declined until it was but 45½ per cent of the average value seven years ago.

The use of automobiles in a utilitarian way by business men generally, doctors, army and Red Cross workers, farmers, contractors, builders and salesmen was brought out and supported by an ample array of facts and data. The evidence included a technical discussion on the shipping of automobiles and the furnishing of freight cars which does not rest as heavily at this time on the western lines as it formerly did.

Freight Advancement Not Justified

The Commission was informed that the proposed classification does not adequately cover the shipping of automobiles as it now obtains with respect to loading which now exceeds the minimum carload weights, particularly on Western shipments, and it is, therefore, a much more desirable class of freight than it was heretofore.

In support of their action Chairman Fyfe of the Western Classification Committee pointed to the decrease offered in the rating on freight machines, but Mr. Marvin declared that this was long over due and had been contended for during the past several years, similar action having been taken by the Eastern and Southern lines long ago. It was pointed out that the reduction in the rating on freight machines could not be offered to the one hundred or more manufacturers who make passenger machines exclusively as justification for advancing their rating.

Chairman Fyfe also tried to show that the carriers' earnings would be about equalized by advancing the passenger machine rating and reducing the truck rating, but Mr. Marvin contended that the much larger volume of passenger machines in normal times disproved this statement and that each type of machine should be rated on its merits. He also produced a summary of all the light-loading articles in the classification pointing to the fact that none of them moved in such volume as automobiles, but that it was only on the automobiles that the consolidated classification showed an increase.

Wheels, Tanks and Other Parts

Objection was also made to an increase from 24,000 lb. to 30,000 lb. carload minimum on automobile wheels shipped in the East; an increase of one class in the carload rating on gasoline tanks, spring assemblies and jacks in the East; the minimum weight on 50 ft. cars in the West would be increased 2000 lb. which was stated would affect certain types of machines which cannot be double-decked and attain heavy loading. Rules that would require open car shipments to be covered by fireproof tarpaulins and detachable parts boxed and attached to the floor of freight cars, were opposed on the ground that the manufacturers have safer ways of hiding the tools from view that would be better for both shippers and carriers and that all the manufacturers can do is to use tarpaulins that have been fireproofed. The carriers thought that on these points they could come to an agreement with the shippers.

Fordson Tractor Price Advanced

Regular Prices in Effect, and Dealers and Distributors Make Profits

SALINA, KAN., Aug. 8.—The price on Fordson tractors has been advanced. The period of distribution "without profit" is at an end. Everybody now is making some money.

Probably the prices which prevail here may be taken as typical of what the Fordson prices will be everywhere, as in all probability a uniform price will prevail, freights being taken into consideration.

The Hudkins Tractor Co., distributor here for the Fordson in the 50 northern counties of Kansas, is making the following prices:

Retail price at Salina for the tractor	\$920.00
Retail price at Salina for the No. 7 Oliver plow	145.00
Retail price at Salina for the Lean harrow, f.o.b. Mansfield..	146.00
Price of tractor to sub-dealer, f.o.b. Salina	787.50

To this price the dealer is permitted to add a profit of 12½ per cent.

As far as it is possible to ascertain here the price of the tractor to the distributor remains as it was, \$750, f.o.b. Dearborn, Mich.

Nor has any change been made in prices to distributors on the No. 7 Oliver plow nor the Lean harrow.

For the present the distributors and dealers selling the Fordson tractor will confine their equipment sales to the plow and the harrow, but will take on other lines as rapidly as they receive the approval of Henry Ford.

Government Contractors May Take Over Special Plants on Completion of Work

WASHINGTON, Aug. 13.—Hereafter manufacturers who are furnished with special materials at the Government's expense may agree to take over such facilities at a fair value. Manufacturers frequently have to construct additional buildings or provide such machinery in order to fulfill terms of war contracts. Under the terms of the Government contracts now made, title in such improvements vests in the United States. The new clauses in the contracts give the contractors opportunity to take over these new facilities, paying for them at their appraised value at the time of making the offer, either by payment of money direct or by an amortization plan.

If the contractor does not make the Government an offer or if his offer is unacceptable the Government retains the right to remove all facilities provided after the termination of the contract. A reasonable time is given to the Government to remove all facilities, or if the Government prefers to keep the facilities, the contract provides that it may buy

SIDE GUIDE & CRUISE

the land upon which they have been erected.

Increased manufacturing facilities created by the War Department exclusive of the new industries serving the Navy and Emergency Fleet Corporation, from April 7, 1917, to July, 1918, cost \$400,000,000. Seventy per cent has been or will be spent in sections of the country other than in the New England or east central states. In fact the investments have been distributed through almost half of the United States.

Dealers' Association to Meet War Industries Board on Car Curtailment

WASHINGTON, Aug. 13—The National Automobile Dealers' Association and the War Industries Board will hold a conference regarding curtailment of the passenger car industry on Friday, Aug. 16, at 10 o'clock. This meeting is the result of numerous telegrams from officers and members of the association requesting a hearing before the board in relation to its suggestion that automobile manufacturers convert their factories to 100 per cent war work by Jan. 1, 1919. The meeting will be between the officers of the association and the sub-committee of the War Industries Board, which deals with the automobile industry.

Possible seizure of the stock of materials now on hand in passenger car factories is hinted at by the War Industries Board in its statement, which says the board "will not deprive the manufacturers of stocks of material they have on hand unless the demand of the war situation requires it, in which event the automobile industry will be treated as any other industry would be under like conditions."

The War Industries Board, in its formal statement, announcing the meeting for Friday, also says that it "wishes the automobile dealers and everyone else to understand that the letter to the automobile manufacturers (suggesting a 100 per cent war work program) was prompted only by labor and material conditions that made it imperative if the Government's war program is not to be interfered with."

Government Traffic Offices

Established at Detroit and Other Points to Facilitate Movement of War Supplies

DETROIT, Aug. 13—For the purpose of facilitating the movement of materials and supplies for the War Department, the Government has established an office in Detroit and several other points throughout the United States. These offices will be under civilian traffic managers with commissioned officers as assistants where there is need of help. The Detroit office will be in charge of A. J. Dutcher.

In circular No. 2A, superseding and canceling No. 2, the functions of the bureau are explained, in part, as follows: The duties of those in charge of branch and district offices with respect to the transportation of property are as follows:

A. To represent the Inland Traffic Service in all matters within its jurisdiction, subject to the established rules and regulations.

B. To promptly and effectively respond to all requirements of the War Department pertaining to the transportation of War Department property, inland and coastwise.

C. To respond, with respect to matters within their jurisdiction, to requests from officers and representatives of the United States Railroad Administration and the individual carriers, including water lines.

D. To perform all duties pertaining to the transportation, inland and coastwise, of all property of the War Department moving by express, freight or otherwise, and the routing thereof, beginning with the ordering of cars or other vehicles for use in shipping the property.

E. To exercise special supervision over the shipment of property by express

and to substitute freight service when practicable.

F. To inform themselves with respect to the service available by inland and coastwise waterways and the rates applicable, and to encourage the movement of the maximum amount of property via such routes when safe and practicable and the expense therefor is not in excess of the expense for movement by rail, including cartage and considering land grant deductions. Any departure from the latter rule must be approved by the chief, Inland Traffic Service.

G. To confer with officers and agents of the carrier, to insure the prompt movement to its destination of all property of the War Department being delayed en route; to report to the consignee and to the chief, Inland Traffic Service, through the proper channels, the action taken in all such cases, and for such other purposes as may be necessary.

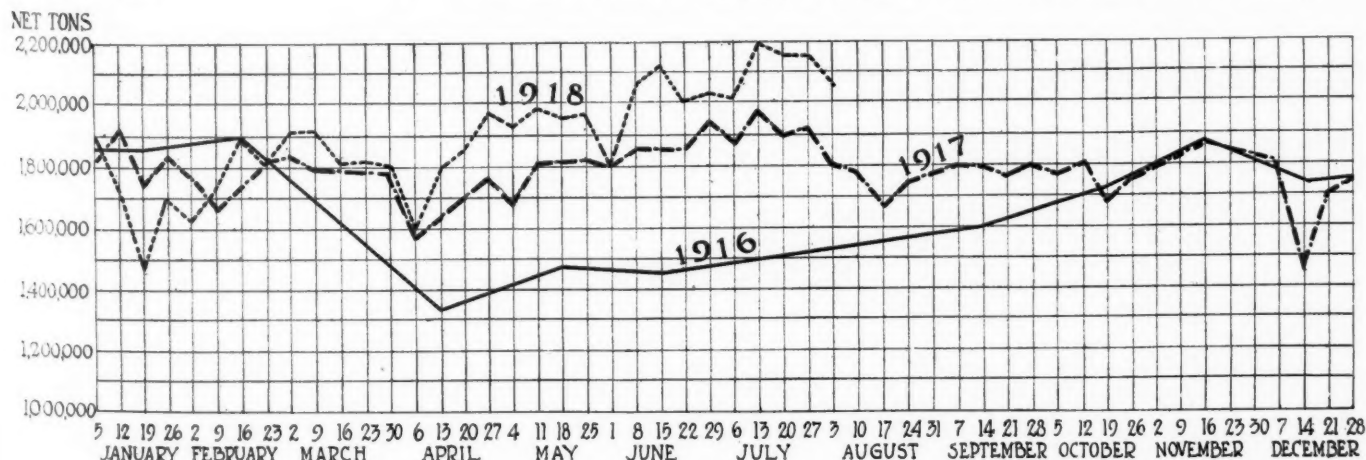
H. To keep themselves informed at all times with regard to the conditions at important railway centers and junction points, transfer depots, etc.

N. Y. to Announce Approved Headlamp Devices Sept. 1.

ALBANY, N. Y., Aug. 10—Secretary of State Francis M. Hugo is not expected to be able to announce the full list of non-glare headlight devices until about Sept. 1. About forty devices are waiting at the Electrical Testing Laboratories, East End Avenue and Eightieth Street, New York, for test. The tests will be in charge of W. P. Little, who will begin the work as soon as testing reflectors are received.

Transport Truck Elects Officers

MOUNT PLEASANT, MICH., Aug. 10—At the first directors' meeting of the new Transport Truck Co., held July 27, the following officers were elected: President and director of sales, M. A. Holmes; first vice-president and chairman of board of directors, H. E. Chatterton; vice-president and treasurer, A. E. Gorham; secretary, W. D. Hood.



Estimated average total production per working day of bituminous coal, including coal coked. The average daily requirements established by the Fuel Administration are 2,100,000 for the summer months and 1,970,000 during the winter months (from Oct. 1 to March 31)

Lower Car and Truck Taxes Agreed On

Ways and Means Committee Bases New Tax on Horsepower

WASHINGTON, Aug. 9—Lower taxes on automobile and truck users of the nation were agreed upon yesterday by the Ways and Means Committee. The new automobile tax is based on horsepower instead of original cost price. It will raise \$50,000,000 instead of the \$100,000,000 estimated on the earlier tax proposal. The tax agreed upon yesterday applies to users of both passenger cars and trucks and was as follows:

23 hp. or less.....	\$10.00
24 to 30 hp.....	20.00
31 to 40 hp.....	30.00
More than 40 hp.....	50.00

The original tax as proposed, a tax based on the original cost of automobiles and trucks, was withdrawn because of considerable opposition due to the injustice of the tax. Under the original tax planned, owners of cars 5 to 6 years old would have been compelled to pay a higher tax in many instances than owners of cars 1 to 2 years old.

It is expected that there will be some opposition to the new tax proposed, owing to the fact that it will lay a heavy burden on the users of motor trucks, which are at no time considered as other than utilitarian.

A Million and a Half Women Replace Men in British Industries

WASHINGTON, Aug. 12—The total number of women directly replacing men in industry in Great Britain is reported as 1,442,000 for January, 1918, by the current issue of the monthly labor review of the Department of Labor. In April, 1917, the number of women directly replacing men was estimated at 1,256,000, over three-fourths of whom were in industrial and commercial occupations and in Government employ.

The degree to which women replace men varies widely in different industries. In Government establishments not including controlled establishments they formed 36 per cent of the total employees; in banking and finance 24.6 per cent; in commercial occupations, 16.9 per cent; in engineering firms 7.14 per cent; in all metal trades 6 per cent. These figures refer only to the women directly replacing men. Many others are working but only partially or indirectly replace the men who have been withdrawn.

Ordnance Department Needs More Men

NEW YORK, Aug. 12—The Government needs still more experts in plants of this district. C. V. Meserole, room 306, 45 John Street, special representative in New York of the Ordnance Department, has issued a call for produc-

tion men experienced in machine shop and erection, ammunition, explosives, loading, small arm and gauge work. These are among the best paying positions in the Ordnance Department, and require men capable of visiting shops, conferring with managers and speeding up the work whenever opportunity presents itself. Selling experience, ability to direct large forces of men and personality are important qualifications.

Farm Tractors at Wisconsin State Fair

MILWAUKEE, WIS., Aug. 12—Twenty-six manufacturers of farm tractors have made reservations of space for display and demonstration purposes at the annual Wisconsin State Fair, to be held at West Allis, Milwaukee County, during the week of Sept. 9-14. The tractor show is expected to be one of the largest yet held in connection with a state fair. The department is operated directly by the management of the fair, while the motor car and truck exposition will again be under the immediate direction of the Milwaukee Automobile Dealers, Inc., which has conducted the motor show on the fair grounds for four years past. The tractor show will be under a tent, while the motor show will occupy a mammoth fireproof building erected for this purpose several years ago. O. E. Remy is general secretary of the fair.

Ford Modifies Wage Plan

DETROIT, Aug. 12—The Ford Motor Co. has modified its wage payment scheme with the result that employees who meet all requirements are entitled to \$5 a day on completion of 30 days' work at the plant. The former rule provided that an employee had to be with the company 6 months before being eligible for the \$5 rate. The minimum wage scale has been raised from 43 cents to 50 cents an hour.

Lee Rubber Shows Substantial Earnings

CONSHOHOCKEN, PA., Aug. 9—The Lee Tire & Rubber Co. has shown net earnings before taxes substantially in excess of \$300,000 on a gross business of over \$3,000,000 during the first six months of the year.

Zwebell Bros. Co. Incorporates

MILWAUKEE, WIS., Aug. 12—Zwebell Bros. Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to engage in the manufacture of a mold for retreading tires and also to conduct a general wholesale and jobbing business in tire repair material and supplies. The principal stockholders are Arthur B., Herbert A. and Albert R. Zwebell, who have been engaged in the motor car sales and repairshop business for many years and recently developed an improved method of dry-cure retreading. Temporary headquarters have been established at 188 Eighth Street, Milwaukee.

No Anthracite for Newark Dealers

Fuel Administrator Refuses Standard Sizes to Automobile Men

WASHINGTON, Aug. 12—The refusal of the Newark, N. J., Fuel Administrator to give standard sizes of anthracite coal to automobile manufacturers, dealers and garages, as reported this past week, is not entirely in accord with the national anthracite distribution plan of the United States Fuel Administration. Anthracite coal is being conserved for domestic purposes almost entirely. It is only allotted for other use in exceptional instances, for example where war plants must have it. The general industry of the country is asked to use only bituminous coal and fine screenings of anthracite coal, known as buckwheat and rice sizes. Garages, however, will be entitled to anthracite coal if they require it. They are classed by the Fuel Administration as public utilities. Automobile dealers are classified as retail establishments, the same as any other retail store, and come under the head of domestic consumers, and are also entitled to anthracite coal. Automobile and truck manufacturing plants will get bituminous coal and buckwheat and rice anthracite unless they are engaged in war work, and anthracite coal is essential to the operation of the factory.

War Conservation Investigation of Wisconsin Dealers

MILWAUKEE, WIS., Aug. 12—Alfred Reeke, head of the Alfred Reeke Co., Milwaukee distributor of the Nash, is making a tour of investigation as state director of war conservation of the National Automobile Dealers' Association to determine if Wisconsin dealers and garagemen are complying with the regulations and rules relative to the business. Violations reported so far have been few and far between and Mr. Reeke believes he will be able to return with a 100 per cent report. Garagemen in all of the smaller communities have adopted the rules and arranged for an emergency service station for Sunday, holiday and night work under the usual restrictions.

Wisconsin Power Farming Association Formed

MILWAUKEE, WIS., Aug. 12—To promote the "Better Farming" movement and bring the tractor to the attention of every farmer in Wisconsin, representatives of all of the larger tractor manufacturers in this state have organized the Wisconsin Power Farming Association. The first general meeting was held in Milwaukee on Aug. 6. Officers have been elected as follows: President, F. W. Kamm, sales manager tractor department Allis-Chalmers Mfg. Co., Milwaukee; vice-president, Fred. F.

Hatcher, manager Milwaukee branch John Deere Plow Co.; secretary, E. A. Brauh, sales manager Trenam Tractor Co., Stevens Point, Wis.; treasurer, W. F. Loomis, manager Milwaukee branch Oliver Chilled Plow Co. F. W. Geddes, general manager of the Cleveland Tractor Sales Co., Milwaukee, is an additional director.

Hurricane Sweeps Gerstner Aviation Field

WASHINGTON, Aug. 10—Two men died at Gerstner Field, La., as a result of the hurricane which swept that vicinity on Aug. 6. Damage done to Government property is estimated in the amount of \$991,000.

All the planes except five scouts and about 38 training planes were completely demolished. These will be quickly repaired and ready by the time the hangars are reconstructed. The lighting system at the field will need entire overhauling as a result of the storm. Clearing up of debris and the salvaging of engines and machines are now going on.

Wind Velocity of 96 M.P.H.

The wind velocity at the height of the storm was 96 miles an hour. Twelve hangars were totally wrecked; ten partially; only two were left in any condition to afford shelter to property now being salvaged. The quarters of the officers and men held together and defied the storm. Eight men were injured, but not seriously. All the wires are down in the vicinity of Lake Charles and Lake Charles village is badly damaged. Practically all the houses within a radius of 30 miles have been laid flat. The training camp at Gerstner Field also reports that it furnished a guard of soldiers, who assisted in the relief work at the village of Lake Charles.

French Ordnance Experts Arrive

WASHINGTON, Aug. 12—A mission of French ordnance engineers and experts has arrived in the United States. It is to be headed by Lt. Col. J. Martinon, who was at one time in charge of production of a large French ordnance factory. The purpose of the trip is to make possible better co-operation between the industrial resources of the two countries in the output of ordnance materials. The members of the mission will visit factories in this country, and it is expected that a mission of American ordnance experts engaged on a similar mission will visit France at a later time.

Tractors at Columbus State Fair

COLUMBUS, Aug. 8—It is expected that at least 25 tractor manufacturers will exhibit at the Ohio State Fair, which will be held during the last week of this month. Because of the number of tractor exhibitors the fair management has set aside considerable additional space for their accommodation.

National Trademark on Goods

Divergent Views on Proposal Made by Department of Commerce

WASHINGTON, Aug. 10—Both approval and opposition have been voiced by American industry to the proposal of the Department of Commerce for a national trademark to be affixed to American merchandise.

Objections to the national trademark are based on the fact that less important domestic competitors using the same trademark will be benefited in export trade so that they can compete with the larger companies who have spent years of earnest effort and considerable funds to establish their reputations. Another objection is that the trademark will apply to all sorts of products, good, bad and indifferent.

The Department of Commerce replies to this opposition by pointing out the benefits derived from a national trademark. At the present time foreign competitors can use the legend "made in U. S. A." and there is no method for preventing that use. Consequently, to-day foreign manufacturers are competing with American manufacturers. A national trademark will create good will in foreign markets for our products, increasing our foreign trade and popularity.

Bond to Forestall Dishonest Practice

The trademark bill now pending provides a forfeiture of a bond of \$5,000 as well as revocation of the trademark license, which will prevent the sale of dishonest goods abroad and thus forestall boycotts of American goods which have resulted from inferior exports, thus not only disproving that good, bad and indifferent goods can be exported with a national trademark, but substantiating the claim that boycotts will be forestalled.

The fact that the mark will be used by competitors to the disadvantage of the established concern is offset by the delay and expense attached to building up a big foreign business. A domestic competitor who has now export business will begin with a certain amount of good will as a result of the national trademark, but he must still develop a merchandising organization to sell his goods abroad, must overcome the problems of transportation, credits, agencies, special styles and models, correspondence in foreign languages, duties, packing, etc., and when he has accomplished all these if his goods find a market abroad it will not be at the expense of the established manufacturer unless the product is more meritorious, in which event opposition to the trademark is a purely selfish one which will not be considered by the Department of Commerce.

The bill which has been presented to Congress by the Department of Commerce authorizes the Secretary of Commerce to secure a design to be adopted and promulgated as an emblem in the nature of a trademark suitable for affixing in any manner to merchandise produced or manufactured in the United States which is to be known as the national trademark. It is to be registered in the Patent Office in the name of the United States of America, without limitation of time and covering every description and class of

goods recognized under the Trademark Act active in this country.

The trademark is to be protected in foreign countries. Any manufacturers, producers or merchants in the United States can secure the license by making application and payment of a reasonable fee. Bond is to be executed not to exceed \$5,000 that the licensee will faithfully comply with all the rules and regulations.

Provision is made in the bill to protect its rights, to prevent imitation of the trademark and to terminate the license in event of infractions of the rules.

To Finance Tractor Purchases

BOSTON, Aug. 10—With a capitalization of \$1,000,000, nearly all of which has been paid in, the Commercial Finance Corp. of Boston is about ready to start operations financing the sale of motor trucks and tractors throughout New England at first and other parts of the country later. While the motor dealers are not behind it as a body a number of them have invested in the company. On the Board of Directors are F. A. Hinchcliffe of the Jordan agency, who is treasurer of the Boston Automobile Dealers' Association; Edward C. Becker of the Becker-Stutz Co., and John L. Judd, who sells the Smith Form-A-Truck, Gramm Bernstein and Columbia trucks and the Allen and Auburn cars. It is planned to put other motor dealers on the board later. Some of the prominent financiers in Boston are identified with the company. With the tractor field practically dead in New England due to motor dealers not paying any attention to this type of vehicles, the men behind the new company will try to interest farmers in speeding up through the use of such vehicles, and from tractors to trucks to carry the product to market will be a short step. It will finance the buying of passenger cars, too, and its charter allows it to deal in other things, but at first the truck and tractor field will engage the attention of the officers.

State Good Roads Meet to Open Sept. 3

DETROIT, Aug. 12—The tenth annual convention of the Michigan State Good Roads Association will be held here from Sept. 3 to 6 at the fair grounds. More than 100 manufacturers of road machinery have agreed to exhibit and men prominent in good roads movements in this and other states will give addresses. The program has been arranged as follows: Sept. 3, State Highway Commissioners' Day; Wednesday, Manufacturers and Materials Day; Thursday, Michigan State Good Roads Association Day; Friday, Demonstration.

50,000 Unskilled Workers Needed for War Orders

WASHINGTON, Aug. 12—War employers making reports since Aug. 1 of labor shortage show a total need for 50,000 unskilled workers. In some instances operation is virtually at a standstill.

Slater Joins the Williams Foundry & Machine Co.

AKRON, Aug. 12—William J. Slater has resigned as pneumatic tire sales manager of the Firestone Tire & Rubber Co. to become the general sales manager of the Williams Foundry & Machine Co.

E. Van Hanbach has resigned as chief engineer of the Whittier Co., Chicago, to come east and take up the duties of sales manager and engineer with the Schaaps Automobile Co., Brooklyn, N. Y.

W. S. Johnston, president of W. S. Johnston, Inc., Trenton, N. J., distributors of Marmon, Chalmers and Maxwell cars and Selden trucks, has joined the engineering department of the Naval aircraft factory at Philadelphia.

L. Clyde Smith has been appointed assistant general manager and treasurer of the Detroit Weatherproof Body Co., Pontiac, Mich. He recently disposed of his interests in the Detroit Welding & Mfg., Detroit Electric Welder and Burns Starter companies.

Entries for State Fair Coming In

DETROIT, Aug. 13—Sixteen truck and passenger car manufacturers have signified their intentions of entering exhibits in the Michigan State Fair this year, which will be held Aug. 30 to Sept. 8. The names follow:

Dodge Brothers	Denby Motor Truck
Ford Motor Co.	Co.
Olds Motor Works	Detroit Universal
Maxwell Motor Sales	Truck Unit
Corp.	Republic Motor Truck
McCord Mfg. Co.	Co.
Smith Form-a-Truck	Signal Motor Truck
Acme Motor Truck	Co.
Co.	Federal Motor Truck
Acason Motor Truck	Co.
Co.	Frank Foster (Sterling
Nash Motors Co.	Motor Truck Co.)

Seven accessories have also signed as exhibitors, as follows:

L. Lawrence Welding Co.	Irwin Tire & Repair Co.
Specialty Sales Co.	Security Auto Theft
Lyknu Polish Co.	Signal Co.
Coffield Tire Co.	Presto Cloth Co.

May Adopt Treasury Plan of War Profit Taxation

WASHINGTON, Aug. 13—It now appears likely that the Treasury plan of taxation will be adopted in preference to the scheme suggested by Congressman Claude Kitchin. The Treasury tax, which aims to collect at least \$5,000,000,000, demands an 80 per cent tax on actual war profits, to be determined by ascertaining the average annual profits for 3 years previous to our entrance in the war. The average annual profits prior to the war will be regarded as the basis of profits, and all profits in excess of this will be considered war profits, and subject to 80 per cent tax. An alternative tax is also included, the same as the present excess profit tax, from 20 to 30 per cent, and taxpayers will be obliged to pay the tax which brings the higher return to the Government.

Men of the Industry

Changes in Personnel and Position

E. P. Dillon, manager of power division, New York office of the Westinghouse Electric & Mfg. Co., has resigned to become general manager of the Research Corporation of New York. Mr. Dillon came to the Westinghouse company in 1909, having been previously connected with various mining companies.

C. L. Alexander has resigned as sales office manager of Dodge Brothers, Detroit, to assume new duties Aug. 15 as expert in business administration in the Detroit district of the ordnance department.

Senate Aircraft Report Expected Soon

WASHINGTON, Aug. 10—Secretary of War Newton D. Baker was questioned yesterday for more than an hour by the Senate Military Affairs sub-committee on aircraft. None of the details were made public, but it is reported that both the Senators and the Secretary reached a point of irritation. The Senators charged the Secretary failed to properly reply to questions which the Secretary in turn did not apparently see fit to answer.

The committee has finished its hearings and the report, it is said, will be made public some time early next week. It is understood that some instances of "graft" were found and brought to the attention of the Department of Justice. The committee report will deal only with the causes of the so-called "fall-down" of the air program.

Hodgkins Leaves Studebaker

SOUTH BEND, Aug. 12—R. T. Hodgkins, for the past 4 years general sales manager for the Studebaker Corp., South Bend, has been appointed general sales manager of the Cleveland Tractor Co., Cleveland. Prior to his connection with the Studebaker he was head of the sales organization of the hoisting machinery department of the Yale & Towne Mfg. Co.

W. O. Kennington, European consulting engineer of the Remy Electric Co. is now in this country on a special mission for the British government.

Paul J. Barnard, sales manager of the Walker Mfg. Co., Racine, Wis., manufacturer of jacks and other accessories, has resigned to accept a commission as captain in the Quartermaster Department in the U. S. Army.

Decrease in Production of Bituminous Coal

WASHINGTON, Aug. 13—The bituminous coal mines of this country produced 12,422,000 tons of coal during the week ended Aug. 3. This was an increase of 1,563,000 tons, or 14.3 per cent, over the production of the corresponding week of 1917. It was a decrease of 3 per cent, or 396,000 tons, over the output of the preceding week. Car shortage was the chief cause for the decline.

Anthracite shipments during the week ended Aug. 3 amounted to 39,632 carloads, a decrease of 1310 carloads, or 3.2 per cent, as compared with the preceding week.

During the week of July 27 the mines produced 82.6 per cent of their full time output. The losses were due to the following causes: Car shortage, 7.4 per cent; labor shortage, including strikes, 4.2 per cent; mine disability, 4.1 per cent; no market, 0.2 per cent; all other causes, 1.5 per cent.



One of a number of automobile searchlights used on the Italian front. Current is furnished by an engine-driven generator, and a portable searchlight may be operated from a distance by means of the electric cable shown on the reel at the rear

Chevrolet Building New Factory

NEW YORK, Aug. 10—The Chevrolet Motor Co. will erect an addition to its Kingsland Point plant at Tarrytown to provide space for building a large number of kitchen trailers for the Government. The new building will be three stories and basement, built of reinforced concrete. The cost is to be \$175,000 and the contract calls for its completion in 60 days.

Auto-Lite Co. to Make Gun Sight Parts

TOLEDO, Aug. 12—The Electric Auto-Lite Co. has been awarded additional contracts by the ordnance department for sight parts for large guns. One contract calls for panoramic sight extensions and the other for sight levels. They are to be used on the French 15 mm. field gun. The company is also making rifle grenades.

Coal for Detroit Workers Assured

WASHINGTON, Aug. 14—A committee of Detroit coal consumers conferred here with the officials of the United States Fuel Administration regarding coal supply for Detroit, and particularly the domestic consumption supply. It was stated that the supply of industrial coal for Detroit was excellent, but additional assurances were asked for the supply of coal for domestic consumers in order that the labor element in Detroit will receive sufficient coal for domestic use, so that the war industries located in that city will have no trouble maintaining a proper supply of workers. The committee was assured of a satisfactory supply of domestic sizes of bituminous coal.

New Truck from St. Louis

ST. LOUIS, Aug. 12—The Universal Motor Truck & Traction Engine Co. of this city has completed a demonstration truck designed by Daniel T. Timberlake. The truck has a short turning radius,

Current News of Factories

*Notes of New Plants—Old
Ones Enlarged*

offers optional location of motor and has steering aid from the motor. A factory is planned at St. James, Mo. Edward Bray, of St. James, is president of the company. The company has offices in the Syndicate Trust Building, this city.

Building New Winther Factory

KENOSHA, WIS., Aug. 12—Work has begun on the construction of the new plant of the Winther Motor Truck Co. at Kenosha, Wis. It will be of brick and steel, 150 x 350 ft., and with complete equipment will represent an investment of approximately \$125,000. The company is now operating in leased quarters at Winthrop Harbor, Ill., just south of Kenosha.

**Milwaukee Steel Foundry Co. Extends
Factory**

MILWAUKEE, WIS., Aug. 12—The Milwaukee Steel Foundry Co., 101-121 South Water Street, Milwaukee, is making plant extensions and improvements costing \$125,000, which will provide a complete electric steel casting shop to supplement the present converter steel plant having a monthly output of 400 tons. A 3-ton Heroult furnace will be installed. A new pattern shop and storage building, 40 x 80 ft., five stories high, and a new office building, 40 x 50 ft., two stories, are also to be constructed. The electric steel foundry unit will be 100 x 125 ft. Burton C. Wait is president and general manager.

**Pierce-Arrow to Build Hispano-Suiza
Airplane Engines**

BUFFALO, Aug. 10—The Pierce-Arrow Motor Car Co. has made arrangements with the Wright-Martin Aircraft Corp. whereby it will manufacture Hispano-Suiza airplane engines. These will be produced at the rate of 30 per day by Jan. 1, and it is expected that the rate of production will be increased to 50 per day by April next.

**Oakland to Build Trucks Almost
Exclusively**

PONTIAC, MICH., Aug. 8—The Oakland Motor Car Co. will devote most of its capacity to building trucks for the duration of the war. It is expected that production will start in about 90 days. The truck will be a 1-ton model which will embody several new features.

Buick Prices to be Increased

DETROIT, Aug. 14—The Buick Motor Co. will increase prices on its 1919 models, which are expected to be ready on or about Sept. 1, as follows:

Model	Old Price	New Price
H-44; H-45.....	\$1,245	\$1,495
H-46	1,695	1,985
H-47	1,845	2,095
H-49	1,495	1,785
H-50	2,175	2,485

Ben Hur Plant Acquired by Government

CLEVELAND, Aug. 10—The plant of the defunct Ben Hur Co. at Willoughby has been leased by the government for the duration of the war, and the factory is already being placed in readiness for the work.

New Buildings for Overland Completed

TOLEDO, Aug. 13—The additions erected for the Willys-Overland, Inc., to be used for war work to manufacture shells and gun carriages, have been completed and production will begin early in September.

Shop Committees to Spread Education

WASHINGTON, Aug. 14—Employers engaged in Government work have been asked to have shop committees selected by employers and employees, created in all the plants for the purpose of spreading education to increase production. This work is under the Industries Plants Division of the Information and Education Service of the Department of Labor. The creation of these committees is the first step in a nationwide organization of employers and employees for increased production in all lines of war work.

**Automobile Makers Pay \$23,981,000
Revenue**

WASHINGTON, Aug. 10—Automobile and motorcycle manufacturers and dealers paid into the Treasury Department \$23,981,000 under the war revenue bill for the year ended June 30, 1918, according to a statement issued by the Treasury Department.



A British motorcycle machine gun detachment operating in Italy

President Approves Copper Price

Operators Must Not Reduce
Wages; Must Not Sell
Above Maximum

WASHINGTON, Aug. 10—The President has approved the maximum price of 26 cents per pound for copper, which was announced in last week's issue of AUTOMOTIVE INDUSTRIES.

The conditions are: First, that the producers of copper will not reduce the wages now being paid; second, that they will sell to the United States Government, to the public of the United States, and to the Allied Governments at not above the maximum price; third, that they will take the necessary measures, under the direction of the War Industries Board, in the distribution of copper to prevent it from falling into the hands of speculators, who might increase the price to the public, and, fourth, that they will pledge themselves to exert every effort necessary to keep up the production of copper so as to insure an adequate supply so long as the war lasts.

The price takes effect Aug. 15, 1918, and is subject to revision after Aug. 1, 1918, f.o.b. cars or lighters at eastern refineries; f.o.b. cars or lighters at Pacific Coast refineries for Pacific Coast destinations, and f.o.b. cars or lighters New York if shipped to Eastern or interior destinations from Pacific Coast refineries and from refineries in the in-

terior of the United States. All shipments made after Nov. 1, 1918, are subject to any change in price made by the Price Fixing Committee to take effect after that date. This maximum price is subject to the additional charges on copper shapes approved by the Price Fixing Committee on June 5, 1918.

Field Mfg. Co. Making Government Truck Bodies

OWOSSO, MICH., Aug. 12—The Field Mfg. Co. is turning out daily from ten to twelve motor truck bodies, which, when fully equipped, will be mounted machine shops for the repairing of airplanes in France. The company has an order for 450 of these bodies, of which 250 have already been shipped. The bodies are being made under government inspection, a government representative being stationed at the plant at all times. The Government's purpose in having the machine shops mounted on trucks is that the shop may go to a disabled airplane instead of it being necessary to bring the airplane to the shop.

Ford Has Many Electrical Repairs

DETROIT, Aug. 12—An idea of the magnitude of the plant of the Ford Motor Co. can be gathered from the following, which gives only a month's tabulation of the electrical equipment that was required for either new or repair work from April 16 to May 16: Tungsten lamps, 1682; carbon lamps, 2739; mercury vapor tubes, 102; shifters, 36; lamp cord, 1619 ft.

Few Amputations Among Wounded

British Figures Show Causes of
Disablement and Their Effect
on Vocational Re-education

WASHINGTON, Aug. 12—In the current issue of the Vocational Summary, which is the official publication of the Federal Board for Vocational Education, are given the results of an analysis of the causes of disability found among pensioned British soldiers who have been forced to leave the present war because of wounds or illness incurred in it.

As the re-education of disabled soldiers will shortly be undertaken in this country on a systematic basis, the statistics given below should prove not only of interest but highly instructive. They are calculated from a total of 341,025 pension records which had accumulated up to the end of April of this year.

Small Percentage Need Amputation

In view of what we have seen here and there in the way of photographs of armless and legless soldiers, learning new occupations, it is rather surprising to note that only a total of 4.9 per cent of injuries sustained by these more than 300,000 disabled men necessitated an amputation of an arm or leg.

The percentages of the different forms of disablement among these retired British soldiers were as follows:

Wounds, etc., to legs not necessitating amputation	11.9
Chest complaints and tuberculosis	11.60
Heart disease	10.3
Wounds, etc., to arms not necessitating amputation	8.45
Rheumatism	6.5
Nervous diseases, shell shock, etc.	6.0
Wounds, etc., to hands not necessitating amputation	4.45
Wounds, etc., to head	4.0
Eyesight cases	2.8
Wounds and injuries to legs necessitating amputation	2.6
Deafness	2.0
Wounds and injuries to arms necessitating amputation	1.4
Frostbite, including cases of amputation of feet or legs	0.9
Miscellaneous wounds and injuries	5.55
Miscellaneous diseases	13.36

Bombing the German Base at Bruges

WASHINGTON, Aug. 10—Bruges, the most important German naval base in Belgium, has been attacked so often, says a British report, that it is now perhaps one of the best defended points against night bombing on the Western front. The report, made by a member of the Royal Air Forces, describes in detail the work and sensation of night bombing.

The pilot and observer of a British night bombing machine proceeding to Bruges have no difficulty in finding their way. Searchlights moving restlessly over the town make a haze of light that can be seen 30 miles off. Furthermore, air "scares" are so numerous each night that the city is a constant display of red flashing bombs and brilliant emerald-colored balls of fire mounting into the sky and ending at some usually imaginary fall.

Nordyke & Marmon Co. Establishes Car Line Service for Its Employees



A special street car service for its 4000 employees is being operated by the Nordyke & Marmon Co., Indianapolis. Ten street cars run for two hours both morning and evening between the factory and the center of the city. Company employees operate the cars

Drawing near the city the observer crawls through a little door in the nose of his machine, examines his bombing handle and adjusts the bomb-dropping sight. As he kneels on the little wooden cock-pit, 10,000 ft. or more above the earth, he is usually so absorbed in his work watching the ground and seeking the objective that his surroundings seem perfectly normal and he is entirely at ease.

He watches for the black line on the canal, which serves as a guide, and directs the pilot with a wave of the hand. The approach to the town is forecast by long rows of shipping docks; far to the left lies the dark line of the Belgian coast, and the guarding searchlights shining over Ostend and Zeebrugge move constantly.

The observer, states the report, waves his hand, the roar of the engine dies in silence, the machine dives for its target. The bomb handle is unstrapped. The observer leans far over the front, following the course of the little metal bar of the sight. He quickly guides the pilot toward the left and the bar sweeps round and crosses the section of the objective.

Hundreds of Gunners Watching

The observer then checks the pilot and holds his bomb-lever in readiness. Hundreds of Germans stand waiting at their guns below, but the observer has time to think of nothing but the passage of the sight bar over the objective. Suddenly the sight registers the range. He pushes the lever forward slowly, pulls it back and pushes it forward again and again.

From the rear of the plane comes the clatter of 14 dropping bombs. The pilot turns and the machine sweeps around away from the shower of shells, the searchlights and explosions that the bombs will bring; meanwhile the observer keeps his eye on the objective, waiting for the red spurt of flame that marks the hit.

The bomb strikes. Sheets of flame shoot upward. Simultaneously come hundreds of green balls streaming from the ground, while like a handful of ribbons the searchlights are thrown up into the skies. The airmen fly home content with their job, leaving the searchlights vainly scouring every quarter of the heavens—too late.

Canadian Ford Resumes Operations

DETROIT, Aug. 12—After a complete shut-down of more than 5 weeks, the Canadian factory of the Ford Motor Co. at Ford City, opposite Detroit, has resumed operations to-day, but with less than 50 per cent reduction of the working personnel. Only 100 cars will be the daily production. Previous to the shut-down the normal output of the company averaged from 225 to 250 cars a day. While the company announced it was compelled to close down because of material shortage, numbers of the employees who signed petitions, demanding a wage of \$5 a day, charged they were dismissed and locked out.

Madison Dealers Help Farmers

Employees Are Released to Work on Farms in Vicinity of City

MADISON, WIS., Aug. 10—Dealers and garagemen of Madison, Wis., state capital of Wisconsin, have gone perhaps farther in war conservation work than those of many other cities by releasing their employees, who are physically fit for such work, to work on the farms in the immediate vicinity of Madison during the rush of the harvesting season. The men are being released for two or three days at a time, depending upon the urgency of the calls for farm help. They have agreed to accept whatever wage is paid by the farmer for their services.

The movement resulted from a number of conferences held by the dealers' section of the Madison Association of Commerce, comprising all the dealers and garage owners of Madison. It was decided to enter into an arrangement with the United States Employment Service, through the Madison office, whereby calls for men be made to the employers and they select members of their staffs to respond. The dealers' section includes oil and tire dealers and, in fact, all interests allied with the automotive industry. The action was given wide publicity through the medium of a large display advertisement in the Madison newspapers, in connection with the announcement of the adoption of the war conservation program of the National Automobile Dealers' Association, curtailing hours of service, eliminating free service, enforcing a strictly cash basis and other reforms.

Louis F. Schoelkopf, president of the Madison Association of Commerce, and one of the pioneer dealers and garagemen of Madison, is given credit for the origination of the idea of sending mechanics to the harvest fields. A survey of the employees of garages and repair-shops showed that a great many of the men have had farm experience and are competent to assist threshing gangs and shocking crews. Thus they are able to command practically the same wages as skilled farm laborers. The farmers have been quick to avail themselves of the help thus provided and glad to pay top-notch wages for this class of work. The present month is the most active harvesting period in southern Wisconsin, and more calls are being received than can be filled with the number of men available.

Munitions Plant Opens School for Women

JACKSON, MICH., Aug. 12—The Jackson Munitions Corp. has opened a school of instruction for women munition workers, and from now on classes will be held each week day, at which officials

of the company and heads of departments will give instructive lectures relative to the work. This school is for the purpose of recruiting a large number of women who will be needed when the plant is running at full capacity. The plan is to hire inexperienced women, the only qualification necessary being that they be healthy, strong and American. The school will give the applicant a preliminary knowledge of the general nature of the factory's business. At present a force of 150 women is employed at this factory, but this will be very greatly increased soon.

Changes in War Supply Contracts

WASHINGTON, Aug. 12—Changes in war supplies' contracts which have just been approved by the superior board of review of the general staff of the War Department provide that hereafter manufacturers who are furnished with special equipment at the expense of the Government may agree to take over such facilities at a fair value in diminution of the profit which they otherwise would make.

The increased manufacturing facilities that have been created by the War Department, exclusive of the new industries serving the army and the Emergency Fleet Corporation from April, 1917, to July, 1918, cost approximately \$400,000,000. These investments have been distributed through almost half of the states. Seventy per cent has been or will be spent in sections of the country other than in the New England or east-central states. The new clauses in the contracts give the contractors an opportunity to take over these new facilities. If the contractor wishes to take title to the facilities he may make written offer to the Government.

Goodrich Earnings Almost Double

AKRON, OHIO, Aug. 12—Net profits for the first 6 months of 1918 of the B. F. Goodrich Co., after deduction of maintenance charges, depreciation and doubtful accounts, and after all excess profits and income taxes are provided for, were \$7,150,000. This is almost equal to the profits of the company for the entire year of 1917, which amounted to \$10,544,677. The increase of profit, it was stated, was not entirely due to the increase in war work done by the company, but rather to the large increase in the whole volume of business.

At the recent quarterly meeting of the directors a 1½ per cent dividend was declared on preferred stock, payable on Oct. 1 to stockholders of record Sept. 20. A 1 per cent dividend was declared on the common stock, payable on Nov. 15 to stockholders of record Nov. 5.

Gear Association to Meet

PHILADELPHIA, Aug. 12—The semi-annual meeting of the American Gear Manufacturers' Association will be held at the Onondaga Hotel, Syracuse, N. Y., Sept. 19, 20 and 21. The program of the meeting will be announced later.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Farm Machinery Makers Get Reduction on Steel

The fact that makers of agricultural machinery have secured a reduction of \$5 a ton on steel bar shipments in the second half of the year is widely commented on in the steel trade. A concession to this interest on its bar purchases has been no uncommon thing for years. Government price fixing promised to be the end of it. But there was pressure at Washington to prevent any advance in implements to the farmer. The implement manufacturers finally agreed to make no advance if the Government would get them a \$5 reduction on bars. The steel men were appealed to and the reduction was granted.

It remains to be seen how far complications in other bar-consuming trades will result from 2.65c. bars for agricultural purposes. But no other industry heretofore has been able to secure the preference given to implement makers and the odds are even greater now with the Government thrown into the agricultural scale.

High heat and humidity cut down pig iron and steel outputs last week, estimates for the Pittsburgh district running from 10 to 15 per cent, while losses at some eastern Pennsylvania plants were considerably higher.

A factor to be counted on as the American army in France grows is the spirit of the steel workers, particularly in mills supplying the chief essentials, as plates, shell steel and latterly rails. There are some signs of the same effort to get output that has been seen at shipyards, but they might be more general.

The estimated July production of steel ingots, based on the compilations of the American Iron and Steel Institute, is 3,531,600 gross tons. The daily rate fell off about 2.9 per cent from that of June, and while the estimated annual production rate on the July figures (counting 26 days) is only 41,984,000 tons, the rate on the actual output of the last five months, or since the winter and railroad handicaps of January and February, is 42,496,000 tons.

A meeting of the special committee of steel manufacturers with the director of steel supply will be held at Washington next week. The decisions to be made, having to do with the recent more pressing demands from abroad, are regarded as among the most important in the present effort of the War Industries Board to meet the situation.

The action of the War Industries Board in denying steel for passenger automobiles is in line with what has been plainly indicated for months as to the narrowing of the channels of steel uses. Some mills, as in sheet and wire lines, are tending to a steady 60 per cent operation.

In the attempt to increase pig iron and steel output, the new by-product coking capacity is strongly counted on. Of the proposal for Government-aided new construction in iron and steel, the main tangible development is in connection with new steel capacity in the Birmingham district.—*Iron Age*.

Manufacturers Look for Only 75 Per Cent Cut

(Continued from page 290)

per cent basis. This, of course, they cannot guarantee to do, either for us or for any other so-called non-war industry.

"The board feels that the curtailment will have to be greater than 50 per cent, but at this last meeting the board expressed the wish and desire for the automobile industry to continue in business; that they realized the importance of this industry to the country in its regular business of making passenger cars, and its particular importance to the Government at this time in carrying out its war program.

"The suggestion that the industry go to war work up to 100 per cent is, I believe, what the War Industries Board would consider an ideal situation, from their standpoint, and I think this statement is made more as a warning to our companies to take on war work. The War Industries Board feels, of course, that any company that is engaged in non-war work will have its interests best served if it has 100 per cent war work, but the board never has in any conference expressed a desire for a 100 per cent curtailment of passenger cars. But it feels that the curtailment will have to be greater than 50 per cent. The War Industries Board has never discussed anything more drastic than a 75 per cent curtailment.

"We have been assured again by the War Industries Board that if steel and other materials are available after the war program is taken care of, our industry will get its share, and the board has promised that it will not under any circumstances make any definite commitments to our industry or to any other so-called non-war industry.

"We were somewhat handicapped in our discussion at this last meeting because the inventories were not all in and the board felt that it could not deal properly with the situation until these figures were available. However, after these figures are completed, we are to have another meeting with them, when it will be determined what steel and other materials can be released to the passenger car manufacturers, and on what basis.

"I have written to President Clifton stating it may be advisable to hold another membership meeting after the inventories are completed, and we have

Lake Iron Ore Movement Breaks All Records

WASHINGTON, Aug. 14—A record breaking movement of iron ore by the Great Lakes fleet is officially reported to the Shipping Board. Notwithstanding the transfer from the Great Lakes of a considerable number of seagoing vessels to transatlantic service, more ore is being moved by the lake carriers than ever before in the history of the trade. The figures for July broke all monthly records. In that month a total of 10,659,203 tons of ore was brought from the Lake Superior mine.

These results have been achieved by speeding up operations of the lake fleet under the direction of the Shipping Board. Many days have been cut from time in port, thus contributing in effect an increase of tonnage. In accordance with instructions from the Shipping Board, the carriers, whenever possible, are loading to the waterline.

To the Shipping Board, the chief significance of the record-breaking movement of ore is the assurance it gives of an increase in the output of steel. An indicated deficiency of this material for war requirements has been causing the board considerable concern.

Plenty of Oil Tank Cars Available

WASHINGTON, Aug. 13—If oil production during the coming months falls below the standard set by army and navy officials no blame can attach to the Railroad Administration, according to Director-General McAdoo. Sufficient tank cars have been provided in all fields, he said, to carry the production to distributing points without delay.

Several months ago, Mr. McAdoo pointed out, oil producers were complaining because they could not obtain tank cars to carry their products. The tank cars, he said, were placed under the control of the Government and were distributed so as to provide tonnage in all oil fields.

Marine Corps Places Contracts

WASHINGTON, Aug. 12—The Quartermaster of the U. S. Marine Corps has placed the following contracts:

The Trailmobile Co., Washington, D. C., 12 trailmobiles.

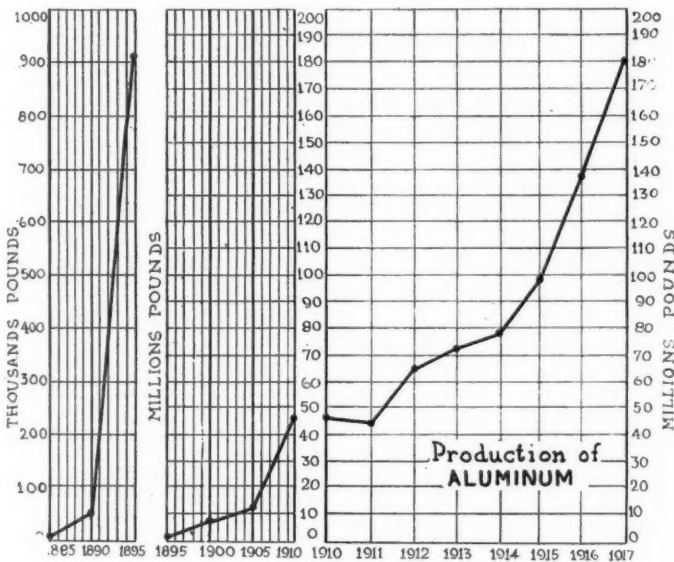
H. W. Johns-Manville Co., Philadelphia, Pa., fuse renewals.

had a chance to discuss the matter again with the War Industries Board. In order to expedite matters, I would suggest that if you have not sent in your inventory of materials, that you do so at once, as failure to do so is only holding up further negotiations with the board for the materials which we need."

AUTOMOTIVE MATERIALS MARKETS

Materials Market Prices

Acids:		Fabric, Tire (17½ oz.):	
Muriatic, lb. ....	.02-.03	Sea Is., combed, lb.1.65-1.70	
Phosphoric, ct. ....	.35-.39	Egypt, combed, lb.1.25-1.35	
Sulphuric (60), lb. .	.09	Egypt, carded, lb.1.20-1.30	
Aluminum:		Peelers, combed, lb.1.05-1.20	
Ingot, lb. ....	.33	Peelers, carded, lb. .95-1.05	
Sheets (18 gage or more), lb. ....	.40	Fibre (¾ in. sheet base), lb. ....	.50
Antimony, lb. ....	.13-.13½	Graphite:	
Burlap:		Ceylon, lb. ....	.07½-.25
8 oz., yd. ....	.19	Madagascar, lb. ....	.10-.15
10 oz., yd. ....	.24½	Mexican, lb. ....	.03¾
Copper:		Lead, lb. ....	.08-.09
Elec., lb. ....	.26	Leather:	
Lake, lb. ....	.26	Hides, lb. ....	.18-.35¼



The production of aluminum in the United States since 1895. Note the rapid increase since 1911

Nickel, lb. 40-43

Oil:

Gasoline:	
Auto., gal. ....	.24½
68 to 70 gal. ....	.30½
Lard:	
Prime City, gal. ....	.225
Ex. No. 1, gal. ....	.155
Linseed, gal. ....	.184
Menhaden (Brown), gal.	1.20-1.22
Petroleum (crude),	
Kansas, bbl. ....	.225
Pennsylvania, bbl. ....	.400

Rubber:

Ceylon:	
First latex pale crepe, lb. ....	.63
Brown, crepe, thin, clear, lb. ....	.60

Smoked, ribbed sheets, lb.62

Para:

Up River, fine, lb. .	.68
Up River, coarse, lb. ....	.40
Island, fine, lb. ....	.59
Island, coarse, lb. .	.27

Shellac (orange), gal. .70-.76

Spelter08¾-.09

Steel:

Angle beams and channels, lb. ....	.03
Automobile sheet (see sp. table), cold rolled, lb. ....	.06½
Hot rolled, lb. ....	.03½
Tin ..... .91-.92	
Tungsten, lb. ....	.240
Waste (cotton), lb. ....	.12¾-.17

AUTOMOBILE SHEET PRICES

(Based on No. 22 Gage. Other gages at usual differentials)

	Primes only Per 100 lbs.	Primes when seconds up to 15 per cent are taken Per 100 lb.
Automobile body stock.....	\$5.95	\$5.85
Automobile body stock, deep stamping....	6.20	6.10
Automobile body stock, extra deep stamping	6.45	6.35
Hood, flat fender, door and apron, or splash guard stock	6.05	5.95
Crown fender, cowl and radiator casing, deep stamping	6.30	6.20
Crown fender, cowl and radiator casing, extra deep stamping	6.55	6.45
Automobile Sheet Extras for Extreme Widths:		
Nos. 17 and 18 over 36 in. to 44 in., 10c. per 100 lb.		
Nos. 19 to 21 over 36 in. to 44 in., 30c. per 100 lb.		
Nos. 22 to 24 over 26 in. to 40 in., 40c. per 100 lb.		
Nos. 22 to 24 over 40 in. to 44 in., 80c. per 100 lb.		
Black Sheet Extras to Apply to Narrow Widths:		
Oiling, 10c. per 100 lb.		
Patent leveling, 25c. per 100 lb.		
Resquaring, 5 per cent of gage price after quality, finish and size extras have been added.		
Seconds 10 per cent less than the invoice Pittsburgh price for corresponding primes.		

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	62¾	63½	+ ½
*J. I. Case T. M. Co., pfd.	82	85	-1
Chalmers Motor Co., com.	30½	5½	..
Chalmers Motor Co., pfd.	30	40	..
*Chandler Motor Co.	88½	89½	+2½
Chevrolet Motor Co.	134	138	+3
*Fisher Body Corp., com.	37½	39½	..
*Fisher Body Corp., pfd.	89	90	..
Fisk Rubber Co., com.	60	63	..
Fisk Rubber Co., 1st pfd.	100	103	+1
Fisk Rubber Co., 2nd pfd.	78	83	..
Firestone Tire & Rubber Co., com.	104	106	+ ½
Firestone Tire & Rubber Co., pfd.	92	94	..
*General Motors Co., com.	153	154½	+18
*General Motors Co., pfd.	81½	81¾	-1¼
*B. F. Goodrich Co., com.	45¾	46	- ½
*B. F. Goodrich Co., pfd.	98½	100¼	-¾
Goodyear Tire & Rubber Co., com.	159	162	-5
Goodyear Tire & Rubber Co., pfd.	97½	98½	+ ½
Grant Motor Car Corp.	2¼	3¼	..
Hupp Motor Car Corp., com.	3	4	..
Hupp Motor Car Corp., pfd.	79	82	..
International Motor Co., com.	28	32	..
International Motor Co., 1st pfd.	55	65	..
International Motor Co., 2nd pfd.	35	45	..
*Kelly-Springfield Tire Co., com.	49	51¼	- ¼
*Kelly-Springfield Tire Co., 1st pfd.	80	87	..
*Lee Rubber & Tire Corp.	21¾	22	- ½
*Maxwell Motor Co., Inc., com.	26	26½	-2
*Maxwell Motor Co., Inc., 1st pfd.	55	56	+ ½
*Maxwell Motor Co., Inc., 2nd pfd.	20¼	21½	-¾
Miller Rubber Co., com.	110	112	- ½
Miller Rubber Co., pfd.	96½	98½	-1
Packard Motor Car Co., com. ....	..	125	..
Packard Motor Car Co., pfd.	92	97	..
Paige-Detroit Motor Car Co., pfd.	7	8½	..
Peerless Truck & Motor Corp.	13	17	..
Portage Rubber Co., com. ....	..	120	..

	Bid	Asked	Net Ch'ge
Reo Motor Car Co.	14½	15½	+ ½
*Saxon Motor Car Corp. ....	.6½	8½	..
Standard Motor Construction Co.	12	14	..
*Stewart-Warner Speed, Corp.	57½	58½	-2
*Studebaker Corp., com.	43¾	44¾	- ¼
*Studebaker Corp., pfd.	85	90	..
Swinehart Tire & Rubber Co.	50	55	..
United Motors Corp.	32	32½	+ ½
*U. S. Rubber Co., com.	61	62½	+ ½
*U. S. Rubber Co., pfd.	105	106	+ ½
*White Motor Co., com.	43¾	45¼	+1½
Willys-Overland Co., com.	19¾	20	- ½
*Willys-Overland Co., pfd.	82¼	83	..

*At close of business Aug. 14. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

	Bid	Asked	Net Ch'ge
ACTIVE STOCKS			
Auto Body Co. ....	..	7¾	..
Bower Roller Bearing Co. ....	..	18½	..
Chevrolet Motor Co.	136	138	+4
Continental Motor Co., com.	5¾	5½	..
Continental Motor Co., pfd.	94¾	..	+ ¾
Edmund & Jones Co., com.	14	17	..
Edmund & Jones Co., pfd.	75	90	..
Ford Motor Co. of Canada. ....	..	170	..
Hall Lamp Co. ....	..	14	..
Michigan Stamping Co., com. ....	..	..	..
Packard Motor Car Co., com. ....	..	124	..
Packard Motor Car Co., pfd.	92	95	-1
Paige-Detroit Motor Car Co.	18¾	19¼	..
Prudden Wheel Co. ....	..	11½	..
Reo Motor Car Co.	14	15	- ¾
INACTIVE STOCKS			
Atlas Drop Forge Co. ....	..	25	..
Kelsey Wheel Co.	25	..	..

Aircraft Production Purchases

WASHINGTON, Aug. 7—Following is a list of purchases contracted for by the Bureau of Aircraft Production:

July 11, 1918.

United States Gage Co., 67 Wall Street, New York City, 475 gages.
Bower Roller Bearing Co., Detroit, Mich., 2000 outside wheel bearings, 2000 inside wheel bearings.
Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., spares for Curtiss V-2-3 engines, bearings exhaust and intake valves, pistons, crankshafts, etc.
Western Electric Co., 463 West Street, New York, N. Y., 10 wavemeters.
United State Gage Co., 67 Wall Street, New York City, services in repairing approximately 2000 gages for oxygen apparatus.

July 13, 1918.

Hertzell Walnut Propeller Co., Piqua, O., 2500 generator propellers.
John A. Roebling Sons Co., Trenton, N. J., 2,000,000 ft. aircraft wire.
Burd High-Compression Ring Co., Rockford, Ill., 20,000 compression piston rings.
American Propeller & Manufacturing Co., Baltimore, 2000 constant speed regulating fans.

July 15, 1918.

Klaxon Co., Newark, N. J., Strombos horns, wooden chests, bicycle wrenches, etc.
Smith & Hemenway Co., Inc., 114 Colt Street, Irvington, N. J., 800 diagonal cutting pliers, 23,000 side cutting pliers.
Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., spare parts, aileron guides, tubular braces, front and rear instrument boards, hammer brackets, rudder guides, bolts, pins, washers, etc.
Burd High-Compression Ring Co., Rockford, Ill., 30,000 Burd compression piston rings.
Disco Electric Mfg. Co., 500 Howard Street, Detroit, Mich., 1000 synchronizing generators.

July 16, 1918.

American Chain Co., Bridgeport, Conn., 1000 chains.
Disco Electric Mfg. Co., 500 Howard Street, Detroit, Mich., 5310 synchronizing generators.
Engel Aircraft Co., Niles, Ohio, spares for JN4-D planes, axles, engine-bed bearers, cowl, elevators, landing gears, etc.
Engel Aircraft Co., Niles, Ohio, 10 JN4-D airplanes.
Stromberg Motor Devices Co., Chicago, spares for Hispano-Suiza engines, 40 sets of carbureters and spares.
General Electric Co., Schenectady, N. Y., 25,000 regulator tubes, 30,000 ballast lamps.

July 18, 1918.

Western Electric Co., 463 West Street, New York City, 10,000 radio telephone head sets.
Western Electric Co., 151 Fifth Avenue, New York City, electrical supplies, 1500 splicing clamps, 320 grips, 17,612 bridle rings.
Bristol Co., Waterbury, Conn., 1000 air speed indicators.
Westinghouse Electric & Mfg. Co., 803 Hibbs Bldg., Washington, D. C., 2000 airplane radio telegraph transmitting sets.

July 19, 1918.

Western Electric Co., 151 Fifth Avenue, New York City, 10,000 antenna systems.

July 22, 1918.

Pierce-Arrow Motor Car Co., Buffalo, N. Y., 1000 300-hp. Hispano-Suiza engines.

July 23, 1918.

Goodyear Tire & Rubber Co., Evans Bldg., Washington, D. C., auto supplies, 19 tires.
Splittorf Electrical Co., Newark, N. J., parts for Dixie magneto, model 825; breaker

Contracts

covers, lock cups, condensers, magneto wrenches, breaker-fastening stud nuts, etc.

July 24, 1918.

The Holt Mfg. Co., Peoria, Ill., 50 caterpillar truck adapters for F. W. D. trucks.

July 25, 1918.

Linde Air Products Co., 42 So. Boulevard, New York City, 600,000 cu. ft. of free oxygen.

Penrod Walnut & Veneer Co., Kansas City, Mo., 210,000 ft. walnut lumber.
Thomas-Morse Aircraft Corp., Ithaca, N. Y., spares for 150 S-4-C gunnery planes, axles, cowl, elevators, landing gears, rudders, upper and lower wings, etc.

Fay & Bowen Engine Co., Geneva, N. Y., 6000 center camshaft bearings.
Dyneto Electric Corp., Syracuse, N. Y., 55 electric generating sets.

July 26, 1918.

General Rim Co., 47 West Thirty-fourth Street, New York City, license agreement. The right under patent No. 1,135,424, in the Government to make or to have made, and to use and sell during the period of the war and for war purposes only, wire wheels covered by said patent.

July 27, 1918.

Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., Spares for 124 JN4H advanced training planes equipped with dual control and forward gun; axles, engine-bed bearer sets, dual controls, cowl systems, elevators, landing gears, radiators, rudders, etc.

Contracts Awarded by Bureau of Aircraft Production

WASHINGTON, Aug. 12—The Bureau of Aircraft Production has placed contracts as follows:

A. L. Randall Co., 150 North Wabash Avenue, Chicago, Ill., carrier-pigeon baskets and equipment.

Wellington, Sears & Co., 66 Worth St., N. Y., 150,000 yards of balloon cloth.

Eastman Kodak Co., Rochester, N. Y., 50-graflex magazine aero cameras.

General Electric Co., Kellogg Bldg., Washington, D. C. (attention of Mr. C. E. Rowe), 7500 red bulbs; 15,000 white bulbs.

George W. Hartzell, Piqua, Ohio, 68,000 feet walnut lumber.

John B. Ransom & Co., Nashville, Tenn., 40,000 feet walnut lumber.

Coffman Mfg. Co., Washington C. H., Ohio, 25,000 feet walnut lumber.

Italy Orders "Eagles"

DETROIT, Aug. 8—Italy has ordered twelve of the new "Eagle" boats from the Ford Motor Car Co. The boats are to be used against the Austrian fleet in the Adriatic Sea.

Navy Department Contracts

WASHINGTON, Aug. 7—Following are contracts which have been placed by the Bureau of Supplies and Accounts of the Navy Department:

Cleveland Pneumatic Tool Co., Cleveland, drills.
Ingersoll-Rand Co., New York, drills.
Chicago Pneumatic Tool Co., New York, drills.
Ford Motor Co., Detroit, truck chassis.
Carolina Aircraft Co., Raleigh, N. C., flying boats.
Curtiss, A. & M., Corp., Buffalo, flying boats.
Lang Propeller Co., Jamaica, N. Y., propellers.
Ford Motor Co., Detroit, two ambulances.
Maxwell Motor Co., Detroit, trucks.
Studebaker Corp., Detroit, motor truck.

Army Ordnance Department Contracts

WASHINGTON, Aug. 7—Following is a list of contracts and purchase orders recently placed by the Army Ordnance Department:

International Harvester Co. of New Jersey, Chicago, body castings.
Commerce Motor Car Co., Detroit, books.
The Standard Parts Co., Cleveland, perfection heaters.
Atwater-Kent Mfg. Works, Philadelphia, machine-gun sights.
The Nash Motors Co., Kenosha, repair parts for Quad trucks.
Motor Trucks (Ltd.), Brantford, Ontario, machining shells.
American Brass Co., Waterbury, and Michigan Copper & Brass Co., New York, blasting machine.
Briscoe Motor Corp., Jackson, rifle grenades.
Michigan Motor Specialties Co., Detroit, cartridge clips.
Nash Motors Co., Kenosha, water pump.
Nash Motors Co., Kenosha, instruction books.
Chicago Pneumatic Tool Co., Philadelphia, heavy-duty electric drills.
North & Judd Mfg. Co., New Britain, tongueless bar buckles and check D bronze for cavalry bridles.
Nash Motors Co., Kenosha, repair parts for Nash Quad trucks.
Cleveland Tractor Co., Cleveland, commercial tractors.
Hutchins Car Roofing Co., Detroit, tool fastenings for repair trucks.
Electric Auto-Lite Corp., Toledo, panoramic sight extensions.
Electric Auto-Lite Corp., Toledo, sight levels.
C. A. Shaler Co., Waupun, vulcanizing outfit for artillery repair trucks.
Studebaker Corp., South Bend, artillery wheel fastenings and hubs.
The Four Wheel Drive Auto Co., Clintonville, various equipment on F. W. D. trucks.
L. S. Starrett Co., Athol, miscellaneous tools for repair shop trucks.
Firestone Tire & Rubber Co., Washington, demountable tires for Nash Quad trucks.
Cleveland Pneumatic Tool Co., Cleveland, gaskets for mobile repair shop.
The White Co., Cleveland, 1-ton truck chassis.
The Four Wheel Drive Auto Co., Clintonville, repair parts for F. W. D. trucks.
International Harvester Co. of New Jersey, Chicago, and Stewart-Warner Speedometer Corp., Chicago, rifle grenades.
Dayton-Wright Airplane Co., Dayton, bomb release mechanisms.
Doehler Die Casting Co., Brooklyn, die castings.
Grant Motor Car Corp., Cleveland, machining shells.

Calendar

RACING

Aug. 17—Sheepshead Bay.
Sept. 2—Uniontown. Uniontown Speedway Assn.
Sept. 7—Chicago. Chicago Speedway.
Sept. 21—Sheepshead Bay.
Oct. 5—Cincinnati. Cincinnati Speedway.

ASSOCIATIONS

Oct. 7-12—Milwaukee. American Foundrymen's Assn. and 5 allied organizations. Milwaukee Auditorium.

SHOWS

Aug. 16—Claverack, Columbia Co. Tractor demonstration (near Fair Grounds) State Food Commission. Calvin J. Huson, Director.
Aug. 20—North Rose, Wayne Co. Tractor demonstration. State Food Commission. Calvin J. Huson, Director.
Aug. 28—Gates Center, Monroe Co. Tractor demonstration (State Fair) Food Commission. Calvin J. Huson, Director.

Aug. 28-30—West Raleigh, N. C. Tractor demonstration (Farmers' Convention, College Farm). Dr. R. Y. Winters in charge.
Sept. 2-7—Indianapolis, Indiana. State Fair. Indianapolis Automobile Trade Assn.
Sept. 5—Medina, Orleans Co. Tractor demonstration (State Fair) Food Commission. Calvin J. Huson, Director.
Sept. 9-14—Milwaukee. Milwaukee Automobile Dealers,

Inc. Fourth Annual Wisconsin State Fair. Hart J. Ruddle, Mgr.

ENGINEERING

Sept. 2—Cripple Creek, Colo. American Institute of Mining Engineers.
Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street.